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DISEASES CAUSED BY BACTERIA AND FUNGI.

I. HEMMERT-HALSWICK. (1932). Ueber die Pathologische Anatomie der Streptokokkenmastitis des Rindes. [**On the Pathological Anatomy of Streptococcal Mastitis of Cattle**].—*Berl. tierärztl. Wschr.* **48.** 538-539.

II. HÖKL, J. (1932). Ueber Bakteriophagen- und Dissoziationserscheinungen bei einem Streptokokkenstamm aus Milch einer euterkranken Kuh. [**On Bacteriophage and Dissociative Phenomena in a Strain of Streptococci from the Milk of a Cow with Mastitis**].—*Zlb. Bakt. I.* (*Orig.*). **125.** 298-303. 1 fig. [7 refs.]

I. [An address to the Berliner Tierärztlichen Gesellschaft].

Comparing the structure of the udder (in the first place) with that of the lung, the author discusses the histology of streptococcal mastitis at various stages. The condition is essentially a galactophoritis, which affects the lobules to diverse degrees. The exudate is at first characterized by polymorphonuclear leucocytes, though eosinophiles appear early, but later, when the gland substance is disappearing, it is made up chiefly of epithelial cells, lymphocytes, plasma cells and above all eosinophiles.

II. Hökl obtained from mastitis secretion a strain of degenerated streptococci, whose colonies suggested bacteriophage action. At the first passage, broth cultures, or a Berkefeld filtrate of these, inhibited the growth of the strain on agar. At the second passage the phenomenon was no longer present. The activity of the culture and filtrate was destroyed by heating in boiling water for three minutes. Attempts to obtain S and R forms were unsuccessful.—A. W. STABLEFORTH.

WEIDLICH, N. (1932). Bericht über die im Veterinärlaboratorium zu Uzhorod in den Jahren 1929 und 1930 vorgenommenen Milzbranduntersuchungen, zugleich ein Beitrag zur Erkennung des Milzbrandes im Laboratorium. [**Report on the Anthrax Researches undertaken at the Veterinary Laboratory at Uzhorod in the Years 1929 and 1930, together with a Contribution to the Diagnosis of Anthrax in the Laboratory**].—*Prag. Arch. Tiermed.* **12.** 203-223. 1 table. [93 refs.]

In Carpathian Ruthenia, the most eastern province of Czechoslovakia, out of 200,000 cattle and 35,000 horses, about 600 die annually from anthrax. Since 1922 it has been the law that an ear must be removed from all animals found dead and sent to the District Veterinary Surgeon for examination. In all cases judged positive he sends the material to the veterinary laboratory at Uzhorod for confirmation. If the veterinary surgeon finds no anthrax bacillus, and there are no other suspicions of anthrax, the owner may utilize the skin.

In the laboratory four methods are used :— microscopic examination, the Ascoli test, cultivation of the bacillus and experiment on animals. Of these the most important is the Ascoli test ; it rarely fails in cattle if a serum of superior quality is used ; it fails more frequently in horses and pigs. For the microscopic examination, which in consequence of putrefaction fails in a large percentage of cases, the author says that staining with Giemsa solution has proved useful, but even with this staining anthrax bacilli shadows (ghosts) can easily be confused with capsules or shadows of decomposing material. Cultivation of the bacillus is always undertaken when the microscopic and serological finding is negative or doubtful. If there are anthrax-like colonies, then several distinguishing characteristics of anthrax must be established, e.g. motility of the rods, the appearance of the superficial and deep colonies on the agar plate, the growth in broth and its pathogenicity for experimental animals.

For confirmation of anthrax in the laboratory, spleen and blood samples are said to be the most, and ear and skin specimens the least useful.

The number of carcasses released from restriction increases when the veterinary surgeon only examines microscopically venous blood from the ear and does not send the ear for further confirmation ; consequently anthrax spreads. To prevent this it is recommended that ears should in every case be sent to the laboratory for re-examination.—F. BULLOCK.

SANARELLI, G., & ALESSANDRINI, A. (1932). Atténuation graduée, permanente et héréditaire de la Bactéridie charbonneuse, par la lymphe péritonéale du Lapin. [**Gradual Attenuation, Permanent and Hereditary, of** *B. anthracis* **by Rabbit Peritoneal Lymph**].—*C. R. Soc. Biol. Paris.* **111.** 849-851. [2 refs.]

These authors found that cultures of anthrax which were grown in collodion membranes did not produce filtrable forms of the bacillus. When the membranes were placed in the peritoneal cavity of rabbits the cultures became attenuated. This attenuation was retained by subsequent subcultures.—A. J. WILSDON.

I. PARKER, T. (1932). **The Prevalence of Tuberculosis in Swine, and the Need for a more Complete Inspection and Control of Dairy Herds.**—*Vet. J.* **88.** 425-427. [6 refs.]

II. DALLING, T. (1932). **Infection of Pigs with Tuberculosis from Milk.**—*Ibid.* 433.

I. The majority of cases of tuberculosis in swine are caused by infected cows milk ; eradication efforts, therefore, must first be aimed at the production of tuberculosis-free milk. Heating of the milk will of course eliminate the infection ; this is a necessary procedure in this country under the regulations for the control of foot and mouth disease, according to which foodstuffs of animal origin must be heated before they are given to animals.

II. In two cases experimental groups of pigs were found to be tuberculous ; in each case the organism was of the bovine type and milk appeared to be the only possible source of infection. The milk in one case was also fed to ferrets, some of which developed tuberculous lesions ; this particular supply was supposed to be pasteurized.—NORMAN HOLE.

BURROW, H. (1932). **Pre-Natal Tuberculosis.**—*Vet. Rec.* **12.** 11-13. 5 figs.

The author states that congenital tuberculosis of calves is by no means rare. Out of 1,468 calves slaughtered at Birkenhead during 1931, there were tuberculous lesions in six, the distribution of which indicated congenital infection. Records of tuberculosis in the foetus are, however, not so common.

As the lesions in congenital tuberculosis are so often complicated by post-natal infection, the author records his observations in the course of a careful *post-mortem* examination of an eight months old foetus, the dam having been destroyed under the Tuberculosis Order.

Post-mortem examination of the cow revealed acute generalized tuberculosis including lesions in the uterine mucosa.

There were tubercles in the lungs, liver, spleen and kidneys and also in the bronchial, hepatic, right supramammary and other lymphatic glands of the foetus. In some glands early calcification was present.

It is interesting to note that tuberculosis of the supramammary gland can occur during foetal life.—GWILYM O. DAVIES.

VAUDREMER, A., & DEGOIS, E. (1932). Arrêt du développement de la tuberculose expérimentale des Bovidés par un bacille cultivé sur gélose. **[The Arrest of Development of artificially induced Bovine Tuberculosis by the Inoculation of Tubercle Bacilli cultivated on Agar]**.—*Rec. Méd. vét.* **108.** 609-619. [3 refs.]

The authors reported in an earlier article that the maceration of tubercle bacilli in the filtered extract of *Aspergillus fumigatus* brings about a mutation following which the tubercle bacilli grow readily on plain agar. It is claimed that the inoculation of virulent cultures of bovine tubercle bacilli prepared in this way is able to arrest the development of experimentally induced tuberculosis in bovines.

Experiments were carried out to assess the immunizing value of a bovine strain of tubercle bacillus cultivated on plain agar. The first immunity test was made on eight bovines with a suspension in normal saline of the modified bacilli heated for 30 minutes at 56°C. The vaccine conferred no immunity and proved toxic when administered intravenously ; two of the eight animals died within a few minutes of inoculation. In a second experiment a vaccine was used which was prepared similarly to the first except that it was unheated. Eight animals were used in the experiment ; three were each given 10 c.c. of vaccine intravenously, three 20 c.c. subcutaneously and two were kept as controls. The animals inoculated intravenously showed a severe reaction 15 minutes after inoculation. A second dose of vaccine was injected 18 days after the first dose. Negative reactions were obtained in all the animals to tuberculin tests made 47 days after the injection of the second dose.

Forty-five days after the second dose of vaccine each animal was tested for immunity by the intravenous inoculation of 4 mg. of virulent culture. The two controls and two of the inoculated animals were autopsied 231 days after the test dose. These four animals were found to be heavily affected, but the lesions were less extensive in the inoculated than in the control animals.

The remaining four vaccinated animals were killed 353 days after receiving the test dose and only slight tuberculous lesions were found.

A vaccinated animal which had been in contact with tuberculous animals during a period of two years was found on autopsy to be free from tuberculous lesions.—T. M. DOYLE.

URBAIN, E., & BULLIER, P. (1933). Un cas de Tuberculose chez un Ours des Cocotiers (*Ursus malayanus* Raffles). **[Tuberculosis in a Malayan Bear]**.—*Bull. Soc. Path. exot.* **26.** 13-14. [1 ref.]

A male bear brought into the Paris Zoo on the 6th November, 1930, was found a few months later to be suffering from irregularity of appetite ; it grew

rapidly thinner, and in May, 1931, diarrhoea was noticed followed by obstinate constipation. The bear died on the 23rd January, 1932. During the previous May a complement-fixation test with blood serum led to a diagnosis of tuberculosis, and this was confirmed on *post-mortem* examination. The carcass was extremely emaciated and the right lung showed large zones of hepatization covered with tubercles. From exudate from a cavity in the anterior lobe a culture of *Mycobact. tuberculosis* was obtained, and rabbits inoculated with 1/100 mg. of this culture and killed two months later showed minute tubercles in the lungs. As the culture was tubercle bacilli of the human type, it is probable that the bear had become infected through contact with the public by whom he had been generously fed. Monkeys in the same collection were formerly subject to tuberculosis, but are now completely protected, for immediately on arrival they are vaccinated with BCG and separated from the public by glass.—F. BULLOCK.

SAENZ, A., & MANSEAU, A. (1932). Importance de la culture de la moelle osseuse ou " myéloculture " pour le diagnostic de la tuberculose aviaire. [**The Importance of Making Cultures from the Bone Marrow for the Diagnosis of Avian Tuberculosis**].—*C. R. Soc. Biol. Paris.* **109.** 1115-1116.

The authors made cultures on Löwenstein's medium from the bone marrow of 12 fowls spontaneously affected with tuberculosis and of 2 fowls inoculated with a culture. They obtained growths of acid-fast bacteria from 12 of the 14 birds ; cultures were unsuccessful in 2 on account of ossification of the bone marrow and putrefaction.

Eight tubes of medium were used for each case. In two instances, growth appeared in two tubes only ; in four cases in four tubes only. The time taken for growth to appear varied from 9 to 23 days.

The authors also made cultures successfully from the bone marrow of the humerus in two live birds which had been inoculated intravenously with a culture of avian tubercle bacilli 18 days and 24 days previously. The technique employed was to drill through the bone, remove a small piece of marrow and then close the wound by a clasp.—C. McG.

UYEDA, S., NISHIKAWA, J., & OKUBO, K. (1932). Beiträge zur Reinzüchtung der Tuberkelbazillen durch das " Saüreverfahren " nach Löwenstein-Sumiyoshi. [**Contributions to the Pure Culture of Tubercle Bacilli by the " Acid Method " of Löwenstein-Sumiyoshi**].—*Zlb. Bakt. I.* (*Orig.*). **125.** 83-88. 6 tables. [24 refs.]

From cultural experiments made with 14 samples of microscopically negative sputa which were treated for 30 minutes with percentages of sulphuric acid from 3 to 15, and sown without washing on six tubes of each of six different media, it is concluded that the most suitable concentration of sulphuric acid is 5 per cent. and the most suitable medium that of Löwenstein, although that of Petragnani is nearly as good. On both these media the growth of tubercle bacilli and inhibition of contaminants are better than on the media of Petroff, Höhn, Harrold or Lebenau. —A. W. STABLEFORTH.

WARNERY, M. (1932). Sur la résistance des Bacilles tuberculeux à l'acide sulfurique suivant l'âge des cultures. [**The Influence of Age on the Resistance of Tubercle Bacilli to Sulphuric Acid**].—*C. R. Soc. Biol. Paris.* **111.** 575-576. 1 table. [4 refs.]

Several investigators have shown that, in young colonies and young surface growths on liquid media of tubercle bacilli, numerous cyanophilic (non-acid-fast)

elements are present. It has also been observed that, in three to four-day-old surface growths on Sauton medium, tubercle bacilli are less virulent than those from older cultures ; tubercle bacilli attain their normal virulence from about the sixth day.

Warnery has carried out experiments to determine whether this diminution of young tubercle bacilli in virulence and in acid-fastness runs parallel with an increased sensitiveness to the action of sulphuric acid. He found that the resistance to sulphuric acid increased with the age of the bacilli. Four-day-old tubercle bacilli did not resist sulphuric acid for 30 minutes in a greater concentration than 10 to 12 per cent. Five-day-old tubercle bacilli were killed by 20 to 30 per cent. of sulphuric acid, but for six-day-old bacilli a concentration of 40 to 50 per cent. of sulphuric acid was necessary.—T. M. Doyle.

Arloing, F., Dufourt, A., & Demonfaucon, J. (1932). Sur la fixation de l'or dans les viscères des Cobayes sains et des Cobayes tuberculeux. [**Fixation of Gold in the Viscera of Healthy and of Tuberculous Guinea Pigs**].—*C. R. Soc. Biol. Paris.* **109.** 1047-1049. 3 tables.

The authors infected guinea pigs with virulent tubercle bacilli and 18 days later injected increasing doses of sodium aurothiosulphate [sanocrysin]. The proportion of the gold fixed in certain tissues was then compared with the fixation by control animals.

They found that in the tuberculous animal the liver fixed three to four times as much as the normal, and the lungs two to three times as much, and that the extent of gold retention was roughly proportional to the severity of the lesions. The kidneys showed no lesions and afforded no conclusions.

[Compare Okell & Parish, who concluded that tuberculosis of guinea pigs could not be influenced by sanocrysin—this *Bulletin.* **2.** 468].—H. H. Green.

Hayes, F. M., Haring, C. M., & Traum, J. (1932). **Vaccination of Swine Against Tuberculosis with Calmette-Guérin Culture, BCG.** — *Hilgardia, California.* **7.** 235-261. 9 tables. [9 refs.]

In this detailed paper the authors state that one injection of BCG by subcutaneous, intramuscular, intradermal or intravenous routes, or three treatments *per os*, failed to give swine sufficient protection against feeding and intravenous infection to prevent generalized tuberculosis. The culture was grown and prepared according to directions received from Calmette and the swine were shielded from infection after vaccination until 27 to 93 days had elapsed.

In the case of swine vaccinated and subsequently infected by the intravenous injection of virulent culture, it was noted that the controls became emaciated on account of tuberculosis, whereas the vaccinated animals kept their condition in spite of generalized infection. Oral vaccination with infective exposure by feeding tuberculous tissues showed that those pigs which were vaccinated by the mouth had a slightly greater susceptibility to infection than their controls. Swine over six months of age [? unvaccinated] had apparently a greater natural resistance to infection than younger pigs.

In pigs vaccinated subcutaneously, in which an abscess formed at the site of inoculation, no evidence was found that any " premunizing " effect had been produced. It was observed that BCG culture was capable of producing small lesions at the points where the bacilli lodged after injection, but that these lesions healed and that no spread from them occurred. Owing to the diversity of the experiments conducted using various routes and methods in vaccination and

subsequent exposure to infection and various anomalies in results, the paper should be consulted by those interested.—EDWARD F. PECK.

I. FEJGIN, B., & EPSTEIN, T. (1932). A propos du Streptothrix provenant des cultures du BCG. [**Isolation of a Streptothrix from Cultures of BCG**]. *C. R. Soc. Biol. Paris.* **110.** 1109-1112.

II. SAENZ, A., & COSTIL, L. (1932). Nouvelle contribution à l'étude de la stabilité des caractères biologiques du BCG. [**Further Evidence of the Fixity of the Biological Characters of BCG**].—*Ibid.* **111.** 879-880. [1 ref.]

I. The authors refer briefly to the close relationship existing between the tubercle bacillus and the streptothrix. They record the isolation of a streptothrix from a culture of BCG, which was received from CALMETTE in 1925 and maintained until 1929 on glycerolated potato with two passages on bile potato.

The streptothrix was isolated on six occasions, three times from potato medium, twice from Sauton's medium and once from the filtrate of a young surface growth of BCG.

The principal morphological and cultural characteristics of the streptothrix are described.

II. The authors tested the pathogenicity of cultures of BCG grown on Petragnani's medium, in which the glycerol was replaced by a 1 per cent. solution of beeswax in chloroform. On this medium cultures of BCG present similar characters to those of normal bovine strains of tubercle bacilli.

Cultures of BCG after four passages, over a period of four months, on Petragnani's medium did not give rise to tuberculous lesions in guinea pigs when inoculated either subcutaneously or intraperitoneally in doses of 1 to 10 mg.

A second experiment in which the BCG had been subcultured seven times on the wax medium gave similar results.

Saenz and Costil conclude that the hypothesis advanced by certain observers that when BCG resumes its original cultural characteristics it would also recover its virulence has been experimentally disproved.—T. M. DOYLE.

EBER, A., & MALKE, E. (1932). Entfaltet das "Friedmannsche Heil- und Schutzmittel" bei Hühnern zur Bekämpfung der Geflügeltuberkulose ausreichende schützende und heilende Eigenschaften. [**Does the Friedmann Remedy contain Protective and Curative Properties Suitable for Controlling Avian Tuberculosis?**]—*Deuts. tierärztl. Wschr.* **40.** 625-636. 4 tables.

In view of the alleged conflicting opinion on the value of the Friedmann remedy [acid-fast bacilli from the turtle], the authors tested it on two flocks of poultry, one of 24 fowls kept under rather bad hygienic conditions and the other of 33 fowls kept under good hygienic conditions. The experiments, too long to quote in any detail, were performed according to good research principles and the main conclusion arrived at was that the remedy possesses neither specific, curative, nor protective properties against natural avian tuberculosis. It did appear, however, to exercise some non-specific beneficial effect on the general health of infected fowls.

The authors verified the observation of BELLER and HELLINGER that natural infection in fowls does not occur easily by contact and that avian tuberculosis is relatively easily eradicated by attention to simple hygiene. In this connection it is advisable not to retain laying hens beyond their second year. The tuberculin wattle test is valuable for testing hens.

[Tuberculosis does spread easily in fowls, but the infection develops slowly. American authors advocate the elimination of laying hens when one year old].—J. E.

HOWARTH, J. A. (1932). **Paratuberculous Enteritis in Sheep caused by Acid-Fast Organism.**—*J. Amer. Vet. Med. Ass.* **81.** 383-387. 4 figs., 8 graphs. [3 refs.]

Losses of from 10 to 15 per cent. per annum in a flock of 2,000 sheep were found to be due to a disease almost identical with Johne's disease in cattle and acid-fast bacteria were abundant in smears made from the intestinal mucosa. Deep scrapings were treated with antiformin and sown on to the usual type of culture media employed for the growth of the bacillus of Johne's disease. With an incubation temperature of 37·5°C. approximately four weeks elapsed before growth was observed.

This appears to be the first report of the occurrence of Johne's disease in sheep in North America.—R. S. ROBERTS.

GAJZÁGÓ, D. (1932). Ueber die Wirkungsweise des Schweinerotlaufimmunserums. [**The Manner in which Swine Erysipelas Immune Serum produces its Effects**].—*Zlb. Bakt. I. (Orig.).* **125.** 89-110. 11 figs., 7 tables. [29 refs.]

Opposed views have been put forward by a number of investigators regarding the mode of action of immune sera and the author's object was to test these theories. The central point upon which the whole matter hangs is that immune sera do not produce their effects *in vivo* as *in vitro*, and this difference is probably the explanation of the divergence of views expressed.

Series of experiments are described in which the *in vivo* and the *in vitro* results are compared, and from these it appears that the immune serum is not effective through direct action upon the bacilli, but through some action which facilitates or expedites the ingestion of the organisms by leucocytes. The matter is not, however, perfectly simple because, after exhaustion of the immune sera of bacteriotropine, the protective properties of the serum are retained. It appears to be probable that in *in vitro* tests a smaller proportion of the immune amboceptors of different kinds become attached to the bacteria than is the case in *in vivo* tests.
—A. LESLIE SHEATHER.

WERNER, F. (1932). Ein Beitrag zum Geflügelrotlauf bei Enten. [**Avian Erysipelas in Ducks**].—*Deuts. tierärztl. Wschr.* **40.** 148-149. [7 refs.]

The author describes the *post-mortem* findings in four ducks which had died suddenly. In all of them inflammation of the oviduct was present and in some there were other lesions, such as pneumonia, enteritis and epicarditis.

Microscopic and cultural examinations revealed the presence of a bacillus resembling that of swine erysipelas. In a foot-note it is stated that in three of the four cases the organism was definitely identified as the swine erysipelas bacillus by SCHNÜRER.

It was thought that infection took place through the medium of some foodstuff. The birds were kept under good conditions and there were no pigs on the premises.

What appeared to be an important factor in stopping the deaths was the reduction in the number of drakes to ducks.—A. LESLIE SHEATHER.

SAKAMOTO, K. (1932). **Studies on the Specific Substance of** *B. mallei*.—*J. Jap. Soc. Vet. Sci.* **11.** 246-256. 2 tables, 4 charts. [10 refs.] [Orig. in English].

The author has isolated a " specific " substance of a glycoproteid nature and a " non-specific " substance containing nucleoprotein from broth cultures of *Pfeifferella mallei*. The non-specific part was found to be antigenically the more active, but the specific substance to which the name *neomalleinum siccum* is applied

" proved the most reasonable and convenient antigen in the practical diagnosis of glanders, by means not only of an allergic reaction, but also of a complement-fixation test." These substances were obtained from broth cultures by methods of acid-alcohol precipitation.—NORMAN HOLE.

HOWARTH, J. A. (1932). **B. coli-like Organism Causing Abortion in Sheep.**—*Cornell Vet.* **22.** 253-260. 1 table.

An outbreak of abortion in a flock of 820 Merino ewes located in the Sacramento valley of California is described. Premature expulsion of the foetuses occurred in upwards of 219 cases, and 101 of the ewes died. An organism resembling *Bact. coli* was isolated from the body tissues and fluids of the foetuses, placental cotyledons and uterine discharges of the ewes. Saline suspensions of this organism, when inoculated subcutaneously or intravenously, were capable of causing abortion in pregnant ewes. In such experimental cases positive cultures were obtained from the foetus placenta and uterine swabs. The biochemical reactions of nine strains of the organism are described. Serum obtained from sheep that had aborted showed very little or no agglutinin content when a composite antigen made from a number of strains was employed. In experimentally produced cases, however, agglutinins for the organism inoculated were formed. In explanation of this peculiar phenomenon, the author states that it may possibly be accounted for by the acuteness of the infection or by the inability of the organism to produce agglutinins.—WM. S. GORDON.

LEHMANN, H., & JUSTATZ, H. J. (1932). Untersuchungen über die Frage, ob sich menschliche Colibakterien von tierischen durch Präzipitation unterscheiden lassen. [**Investigations regarding the Question whether *coli* Bacteria of Human Origin can be distinguished from those of Animal Origin by Precipitation**].—*Zlb. Bakt. I.* (*Orig.*). **124.** 41-60. 12 tables. [67 refs.]

The importance of attempting to determine whether *Bact. coli*, occurring in drinking water, are of human or animal origin lies in the information such a distinction would furnish in tracing the sources of contamination.

The paper comprises a large number of tabular statements of tests in which extracts of *Bact. coli* of varying origin were tested with a large number of sera.

The broad results obtained indicated that the precipitin test does not furnish any information to permit of the differentiation of the strains.

—A. LESLIE SHEATHER.

STANDFUSS, R., WILKEN, H., & SÖRRENSEN, G. (1932). Untersuchungen und Versuche über Gärtner- und Paratyphusbakterien ausscheidende Rinder. [**Investigations and Experiments regarding Cattle excreting Gärtner and Paratyphoid Bacilli**].—*Zschr. Infektkr. Haust.* **42.** 132-176. 1 table.

The authors record their observations on six cows which excreted bacilli belonging to these groups, and also their experiments with the strains which they recovered from samples of their faeces and from the organs of some of them which died or were slaughtered. The urine, milk and blood were examined bacteriologically. Agglutination tests were carried out and the milk was subjected to examination. Organisms of the food poisoning group were detected in milk and urine on a number of occasions, but the authors do not appear to feel quite justified in excluding completely the possibility that, at least in the majority of tests of the urine, accidental contamination with faecal matter occurred.

Of the five cows under observation two became ill and died. One apparently

cleared itself of the infection and two were carriers which never showed any evidence of ill health. These two animals were slaughtered and subjected to detailed bacteriological examination. Gärtner's bacillus was recovered from the gall-bladder, liver, lymphatic glands and kidneys.

Agglutination tests showed that the serum of the animal, which eventually became cleared of the organism, gave a positive result at a dilution of 1 : 100. No indication appears to be given regarding the density of antigen used.

The use of bile as a means of enriching seed material was not found to be valuable in every case and the best results were obtained by the use of malachite green and tetrathionate.

Calves allowed to suck the cows excreting the paratyphoid bacilli became infected and recognizably ill in two cases, but in two other cases no illness developed. Paratyphoid bacilli were recovered in very small numbers from the faeces of calves which were brought into the experiments at different times, but the source of the infection was not traced. In none of these cases was a positive agglutination test obtained.

The authors distinguish between actual infection of the animals, as shown by their bacteriological and serological tests, and animals merely harbouring bacilli of the group in their alimentary canals. Only the former are of importance from a food poisoning point of view.—A. Leslie Sheather.

McGaughey, C. A. (1932). **Bacteria of the Enteric Group in Poultry.**—*Vet. J.* **88.** 16-26. 2 tables. [36 refs.]

The author reviews the literature dealing with infections in poultry by enteric bacteria other than *Bact. pullorum* and *Bact. gallinarum*. He isolated four strains of paradysentery bacteria from fowls and two from chicks and suggests that in four of these six cases the bacteria were probably responsible for the clinical conditions observed.

Five separate instances of infection of birds with bacteria of the salmonella group were observed ; three occurred in chicks, one in a fowl and one in a duck. *Bact. aertrycke*, *Bact. enteritidis* Gärtner and an organism related to *Bact. aertrycke* and *Bact. paratyphosum* B, were isolated from the chick infections ; *Bact. aertrycke* was isolated from the adult fowl and an organism of the salmonella group identical with or closely related to *Bact. enteritidis* Gärtner was isolated from the duck.

McGaughey discusses the problem of food poisoning caused by the ingestion of eggs infected with organisms of the salmonella group. Little is apparently known of the possibilities of food poisoning arising from the ingestion of infected poultry.—T. M. Doyle.

McKenney, F. D. (1933). **Pullorum Disease. A Study of the Relationship of Repeated Agglutination Tests to the Bacteriology and Pathology of the Disease.**—*J. Amer. Vet. Med. Ass.* **82.** 65-75. 3 tables. [5 refs.]

The author assessed the value of the agglutination test for the detection of adult carriers of *Bact. pullorum* on the basis of the lesions present in the ovaries and on the isolation of the organism. The results obtained confirm the findings of other workers on this subject.—T. M. Doyle.

Jansen, J. (1932). Chronische Pullorum-Infectie bij Volwassen Kalkoenen. [**Chronic Pullorum Infection in an Adult Turkey**].—*Tijdschr. Diergeneesk.* **59.** 1047-1049. [Summaries in English, French and German : abst. from orig.]

The author describes a case of infection with *Bact. pullorum* in an adult

turkey. The bird was one of four which were bought at one time. The bird was ill for about three weeks. At *post-mortem* examination lesions were found which suggested the possibility that the case was one of pullorum disease.

Cultures were made from the ovary, which showed evidence of chronic disease, and an organism with the characters of *Bact. pullorum* was recovered. A formolized suspension of this was tested with immune serum and agglutination up to 1 : 5,000 was obtained.

The serum of one of the other three birds also gave a positive agglutination test while the bird was alive. This bird was also found to have oophoritis. Chicks were infected by feeding with the culture.—A. LESLIE SHEATHER.

I. KOMAROV, A. (1932). **Fowl Typhoid in Baby Chicks.**—*Vet. Rec.* **12.** 1455-1457. [9 refs.]

II. DURANT, A. J., & MCDOUGLE, H. C. (1932). **Pullorum Disease Infection of the Leg Joints in Baby Chicks.**—*Vet. Med.* **27.** 357. 2 figs.

I. Komarov describes two outbreaks of avian typhoid infection, *Bact. sanguinarium,* in young chicks. In the first case the hatching eggs were purchased from a farm on which avian typhoid was known to be present among the adult stock. Sickness and mortality occurred among the chicks within one week of being hatched.

A Gram-negative bacillus was isolated from the heart blood and liver and proved by the recognized tests to be *Bact. sanguinarium.*

A similar history was attached to the second outbreak. There was strong circumstantial evidence in both cases that the infection had been transmitted through the eggs.

[Although avian typhoid is mainly confined to adult fowls, it is now recognized that epidemics occasionally occur in chicks, and the source of infection has not yet been definitely determined. Most of the reported outbreaks among chicks have occurred on farms where the disease was present in the adult stock and the possibility of infection being transmitted to chicks by contamination of food, utensils, etc., cannot safely be ignored.

Bact. sanguinarium has been isolated from young chicks and from the ovaries of adult carrier hens, but attempts to isolate it from the eggs of carrier fowls have so far been unsuccessful].

II. Durant and McDougle record the isolation of *Bact. pullorum* from an enlarged tibio-tarsal joint of a three weeks old chick.—T. M. DOYLE.

MEYER, K. F., & ZØBELL, C. E. (1932). **Metabolism Studies on the Brucella Group. IV. The Bacteriostatic Action of Dyes.**—*J. Infect. Dis.* **51.** 72-90. 3 figs., 4 tables. [18 refs.]

ZØBELL, C. E., & MEYER, K. F. (1932). **Metabolism Studies on the Brucella Group. V. The Production of Hydrogen Sulphide. VI. Nitrate and Nitrite Reduction. VII. Dextrose Utilization. VIII. Nutrient Requirements in Synthetic Mediums. IX. Physico-chemical Requirements in Synthetic Mediums.**—*Ibid.* 91-98, 99-108, 109-116, 344-360 and 361-381. 6 figs., 31 tables. [133 refs.]

IV. This is a continuation of the metabolism studies on the brucella group by ZØBELL and ZØBELL, 1932 [see this *Bulletin.* **2.** 641].

The authors discuss the disadvantages obtaining in the dye plate test devised by HUDDLESON for differentiation of the brucella group. They advocate the use of a semi-solid agar medium in tubes containing a constant concentration of dye and inoculated with a constant number of viable organisms. The suspensions

were made from a 48-hour liver agar culture in a balanced cystine salt solution and from 500 to 1,000 viable cells were inoculated into tubes containing 4 c.c. of the medium. By this method they classified 444 varieties received from 20 different countries as follows :—

Dye test.	*Growth shown by given type of Brucella.*		
	abortus (*bovine strain*).	*melitensis.*	*abortus* (*porcine strain*).
Fuchsin 1 : 50,000	+++	+++	O
Pyronine 1 : 200,000... ...	+++	+	O
Thionin 1 : 50,000	O	+	+++

V. In general, the authors find that the hydrogen sulphide test corroborates the dye test, although too much reliance cannot be placed on the test alone. This is mainly because the amount of gas produced appears to vary according to the composition of the medium and its oxidation-reduction potential. *Melitensis* varieties may be active producers of hydrogen sulphide when the oxidation-reduction potential of the medium is adjusted by exclusion of oxygen. It is, however, possible to classify the brucella group into three major and three minor groups by this and the dye tolerance tests.

VI. The routine use of semi-solid media containing from 0·2 to 0·4 per cent. agar is advocated as a standard procedure in the nitrate-reduction test. In such media containing 0·2 per cent. potassium nitrate, all members of the brucella group appear to reduce nitrates, although in some cases the nitrites are also rapidly reduced. In media containing 0·2 per cent. of potassium nitrate and potassium iodide, porcine types evolve gas with rapid disappearance of nitrates and nitrites, whilst *abortus* types very rarely liberate gas in such conditions. These two types grow dispersed throughout the medium containing 0·2 per cent. potassium nitrate. On the other hand, *melitensis* and the Danish porcine strains grow in a limited zone a few millimetres below the surface in such a medium and fail to generate gas in the media containing both potassium nitrate and potassium iodide.

VII. Although consideration was given to various factors concerned in the utilization of dextrose by various brucella types, the authors failed to demonstrate any significant differences by the various types.

VIII. In order that some of the unsolved problems concerning the biology of the brucella group might be elucidated, the authors consider the advantages if it were possible to employ a synthetic medium consisting of a nutrient combination of chemically known and reproducible substances for the growth of such bacteria. A study of the nutrient requirements showed that lactates, citrates, cystine and asparagine can supply the carbon or energy requirements, whilst the ammonium ion and certain amino-acids furnish the nitrogen. Phosphates supply the phosphorus whilst sulphates and thio-amino-acids supply the sulphur. Of the mineral elements, magnesium and either sodium or potassium are essential, whilst iron is beneficial. Tables are given which supply the data concerning the optimal concentrations and relationships.

IX. A further paper considers the physicochemical requirements such as osmotic pressure, surface tension and other conditions. From these studies, a synthetic medium of the following formula has been prepared in which certain varieties of brucella proliferate :—

Sodium ammonium hydrogen phosphate	2·0 g.
Cystine	0·2 g.
Sodium chloride	2·0 g.
Potassium acid phosphate	1·0 g.
Magnesium sulphate	0·1 g.
Asparagine	3·0 g.
Glycerol	20·0 c.c.
Ammonium lactate	3·0 c.c.
Water to make	1,000·0 c.c.

From 0·2 to 0·3 per cent. of washed agar may be added, for if the medium is not semi-solid a reduced oxygen tension is desirable. The normal atmosphere is considered to contain sufficient carbon dioxide for growth. The addition of ferrous ammonium citrate in quantities no larger than 0·01 per cent. and the depression of surface tension to 50 dynes with sodium taurocholate is stated to improve growth. Finally, either a large initial inoculum of viable cells or traces of enrichment substances are necessary to ensure rapid multiplication of brucella in such a medium. The enrichment substances may be killed washed yeast, liver infusion or preparations of cells of brucella or *B. subtilis*.—R. Lovell.

I. Mallmann, W. L., & Gallo, F. (1932). **Studies on the Dissociation of the Brucella Group.**—*J. Bact.* **23.** 33-34.

II. Urbain, A., & Goret, P. (1933). Action des sels de terres rares sur le développement *in vitro* de *Brucella abortus* Bang. [**Action of the Salts of the "Rare Earths" on the Development** *in vitro* **of** *Br. abortus*].—*C. R. Soc. Biol. Paris.* **112.** 36-38. 1 table. [12 refs.]

I. The authors dissociated smooth varieties of bovine and porcine strains of *Br. abortus* and *Br. melitensis* in 10 per cent. immune serum broth, 1 per cent. lithium chloride broth and by aging on liver agar slants. The rough varieties were studied culturally, biochemically and serologically to ascertain their relationship to smooth varieties. Rough varieties on thionin and basic fuchsin plates behaved similarly to *Br. melitensis*. Rough bovine *Br. abortus* antigens did not agglutinate rough porcine *Br. abortus* and *Br. melitensis* sera. Rough *Br. melitensis* and porcine *Br. abortus* varieties were closely related serologically.

II. The authors have studied the influence of certain salts of the rare earths on the growth *in vitro* of *Br. abortus*.

The effects of the following salts were tested :—the sulphates of cerium, lanthanum, samarium, neodymium and praseodymium. 1 per cent. solutions in distilled water of these salts were filtered through Chamberland L_3 candles and added to flasks containing 100 c.c. Martin's broth ; each salt was added to the media in proportions of 0·005, 0·01, 1·0, and 2·0 g. per 1,000.

An acid-soluble white precipitate formed in the medium on the addition of the salt, but the quantity of acid required to dissolve the precipitate inhibited the growth of *Br. abortus*, so it was allowed to remain.

It was found that, in amounts of from 1 to 2 g. per litre, cerium sulphate, lanthanum sulphate, samarium sulphate, neodymium sulphate and praseodymium sulphate exercised a favourable influence on the growth of *Br. abortus*. The same salts in amounts of 3 g. per litre inhibited the growth of the organism.—T. M. Doyle.

Cameron, H. S. (1932). **The Viability of Brucella abortus.**—*Cornell Vet.* **22.** 212-224. [12 refs.]

The work was carried out to collect experimental data in order to ascertain the probable viability of *Br. abortus* under field conditions. A porcine variety

was used throughout. Media enriched with sterile horse serum, and incubated under increased carbon dioxide tension, were used to detect the presence of viable *Br. abortus*. Before concluding that the organism had died out, or when the medium was expected to be contaminated with other organisms, guinea pig inoculation was carried out.

Four and a half hours exposure to direct sunlight was lethal. When the organisms were kept dry in burlap sacking and laid on the laboratory table they remained alive for five days ; similar material in an unheated cellar contained viable organisms for 30 days.

Sterilized soil infected with *Br. abortus* and kept in uncovered petri dishes in an unheated cellar lost its infectivity within four days. In a similar experiment, carried out when conditions were more moist, the organism remained alive for at least 27 days. When protected from excessive evaporation, one lot of infected soil retained its infectivity for 37 days and another, which was more moist, for at least 66 days.

When broth culture was dried in test tubes and stored in a laboratory cupboard, the organisms remained viable for at least 121 days. When dried in the presence of a minimum of nutrient material instead of in broth, the organism lived under otherwise similar conditions for 72 days only.

In urine sterilized by filtration, the organism lived for only four days ; in previously sterilized bovine faeces, protected from excessive evaporation, it lived from 100 to 120 days. It resisted putrefaction due to *Clostridium sporogenes* for at least 93 days. It was viable for 77 days in tap water at room temperature and for 114 days at -4°C.

The value of this paper for reference purposes is increased by concise quotations from previous workers on the same subject.—A. Brownlee.

I. Graham, R., & Thorp, F., Jr. (1932). **The Results of Exposing Cows to Spontaneous Brucella Reacting Sows.**—*North Amer. Vet.* **13.** No. 1. 32-38. 1 fig., 2 tables. [14 refs.]

II. Mullen, A. L. (1932). **Pathological Conditions of the Bovine Joint as a Clinical Manifestation of Bang's Disease.**—*Vet. Rec.* **12.** 1449-1455.

I. The authors refer briefly to the investigations which have been reported on the infectivity of the porcine strain of *Br. abortus* for cattle. In view of the importance of this question, they decided to carry out a contact experiment over an extended period between non-reacting cows and reacting sows.

Six naturally infected sows and a boar were placed in contact with seven non-reacting cows in a paddock one and a half acres in area. At the end of 12 months, five of the six original sows were replaced by eight other naturally infected sows. Two non-reacting sows were also kept in the paddock for 12 months, a non-reacting mare for 21 months and two goats for three and seven months respectively.

The experiment was continued for 26 months and during that period three of the cows showed temporary positive reactions to the agglutination test. The non-reacting sows and goats gave negative reactions ; the mare gave a suspicious reaction for five months and then became negative.

II. The author describes in some detail the pathological lesions observed in the joints of cattle. The joints affected in order of frequency are the hock, knee, stifle and fetlock. He describes the clinical and pathological changes which occur in the affected joint. Bacteriological and biological tests of the bursal fluid usually give negative results. He does not believe that diet [nutritional deficiency] plays any part in the development of the lesions.

Mullen believes that *Br. abortus* is the primary factor in the causation of

the various pathological lesions observed in the joints of cattle, and more particularly in those of dairy cows.

[Many investigators have reported the isolation of *Br. abortus* from one or other of the pathological conditions frequently encountered in the joints of cattle, but whether or not this organism is the primary cause of the lesions has yet to be determined.

It would appear from the evidence available that the majority of these joint affections are traumatic in origin, *Br. abortus* being merely a casual invader carried there in the blood stream].—T. M. Doyle.

Roots, E., & Ridala, W. (1932). Untersuchungen über das Wesen der Brucellose und über die Ansiedlungsorte der Brucella abortus im Körper des Rindes, insbesondere in der Thyreoidea. [**Experiments on the Nature of Brucellosis and on the Sites at which *Br. abortus* becomes located in the Bovine Body particularly in the Thyroid**].—*Eesti Loomaarst. Ring.* **8.** 165-177. 6 figs. on 3 plates, 3 tables. [31 refs.] [Orig. in German].

The authors refer to the present knowledge of the sites at which *Br. abortus* can settle in the body and show that the thyroid gland must be added to the list. The mere presence of *Br. abortus* in an organ, as demonstrated microscopically and by guinea pig inoculation, is not sufficient proof that the organism has settled there ; a histological examination demonstrating local pathological changes is necessary before the fact can be regarded as proved.

Roots and Ridala made careful examinations of the infected cows both *ante-* and *post-mortem* and found *Br. abortus* present to the following extent :—

Cow " Lehik."—*Br. abortus* in the udder, superficial and deep inguinal lymph glands, spleen, thyroid and knee hygroma fluid.

Cow " Klaara."—*Br. abortus* in the udder, superficial and deep inguinal lymph glands and spleen.

Cow " Ounik."—*Br. abortus* in the right rear quarter of the udder and right superficial inguinal lymph gland.

The changes in the thyroid gland are described in detail and are illustrated and compared with the normal thyroid as obtained from three healthy cows.

It is suggested that this observation may have significance in view of a possible hormonal disturbance resulting from *Br. abortus* infection.—J. E.

I. Thompson, W. M. (1932). **The Incidence of Bang Abortion Disease in Tuberculous Cattle.**—*J. Amer. Vet. Med. Ass.* **81.** 348-351. 1 table. [4 refs.]

II. Barnes, M. F., Killham, B. J., Axby, W. A., & Wisnicky, W. (1932). **Majority Report of the Special Committee on Bang's Disease.**—*Ibid.* 493-495.

III. Cotton, W. E. (1932). **Minority Report of the Special Committee on Bang's Disease.**—*Ibid.* 495-499.

I. Thompson tested, for the presence of *Br. abortus* agglutinins, 336 samples of blood obtained from cattle which had reacted to the tuberculin test. Eighty-seven samples gave a positive reaction to the aggultination test, 273 a negative reaction and 12 a suspicious reaction.

II. There was no outstanding work on contagious abortion reported during the year under review, yet encouraging progress has been made. Further evidence was obtained that the disease can be eradicated by repeated blood testing and segregation ; the particular circumstances obtaining in individual herds should always be taken into consideration.

In heavily infected herds the most promising policy to pursue is the building up of a new herd from home-bred young stock.

Thirty-two of the American states now have schemes in progress for the control of abortion disease and most of the states have regulations governing the blood testing of in-coming cattle. The majority of states with an eradication policy insist on the tube agglutination method or recognize as official only the tests done by the state.

"The only successful method yet demonstrated of eliminating Bang's disease from infected herds is through the use of the agglutination test and the elimination of reactors. This test, regularly applied, along with the elimination of reactors, and sanitation, has been an accepted method of Bang's disease control for a number of years, and has been stressed in recent reports by this Committee as the basis upon which free herds can be established and maintained. Last year's report pointed out fundamental essentials necessary in the execution of this tried and proved plan of Bang's disease control. These essentials still remain fundamental to the successful elimination of Bang's disease from any herd."

The Committee recommend that steps should be taken to encourage the adoption of a uniform standard of production and use of antigen. It was suggested that all states should require the identification of reactors and prohibit their entry into clean herds.

Live abortion vaccine should still be regarded as being in the experimental stage and should be used only under official supervision.

III. Cotton surveys briefly the work carried out during the year on abortion disease. He believes that the disease can be eradicated from almost any herd, but doubts whether the results obtained justify the expenditure in time and money. No one method of control is applicable to all herds ; various methods must be practised according to the circumstances, for example, complete segregation, partial segregation and other sanitary measures. In some instances it will be necessary to employ live vaccine, prepared from *Br. abortus* of low virulence, and also vaccination during calfhood.

Cotton considers that the risk is small of human beings contracting undulant fever from cows milk infected with *Br. abortus*.—T. M. Doyle.

McCulloch, E. C. (1932). **The Rôle of Disinfection in the Control of Bang's Disease.**—*Vet. Med.* **27.** 458-461. [11 refs.]

Caustic soda solution is recomended for the disinfection of barns and stables against *Br. abortus* and other organisms. A satisfactory solution was made by diluting high test lye in the proportion of 1 : 150. The sodium hydroxide concentration of the lye is not stated. Similarly whitewash from fresh quicklime was found to be very efficient. There is no caustic action at the concentrations employed and these alkaline disinfectants are odourless, colourless and of moderate cost.—G. D. Lander.

I. McGaughey, C. A. (1932). **Organisms of the B. influenzae Group in Fowls.**—*J. Comp. Path. & Therap.* **45.** 58-66. 1 table. [20 refs.]

II. Kobe, K. (1932). Ueber Befunde von influenza-ähnlichen Bakterien beim Schwein. [**The Occurrence of Influenza-Like Bacteria in Swine**].—*Berl. tierärztl. Wschr.* **48.** 209-210.

I. Organisms of the *Haemophilus influenzae* group can be classified according to their dependence for growth on the X and V factors. The author has isolated seven strains from the respiratory tracts of fowls affected with acute coryza and four strains from apparently normal fowls. All these strains appear to depend upon the V factor only for growth, and correspond to *H. para-influenzae* isolated from

man and cats by RIVERS, and RIVERS and BAYNE-JONES. Some of the strains isolated were pathogenic for mice, but their pathological significance in the fowl is uncertain.

II. The author briefly reviews the literature which connects swine influenza with organisms of the *H. influenzae* group. He points out that the American form of the disease has not been reported in Germany, but describes his finding of an organism very similar to *H. influenzae suis* (LEWIS and SHOPE) in the lungs, trachea and bronchial lymph nodes of young pigs. Cultures of the organism proved non-infective for pigs, although from 20 to 60 per cent. fatal for mice. Experimentally, however, it was found possible to produce a condition in pigs, simulating the natural disease in some respects, by the intranasal inoculation of an extract of the lung tissues in which the organisms were present.

—NORMAN HOLE.

BARG, G. S. (1932). Ueber das Studium der Anaeroben und ihrer Toxine mittels der Explantationsmethode. I. Mitteilung. [**A Study of Anaerobes and their Toxins by Cultural Methods. Part I**].—*Zschr. Immun.-Forsch.* **74.** 367-371. [7 refs.]

The author describes the technique and the results of experiments carried out in order to observe the effect of the toxins of certain anaerobic organisms on tissue culture. For this purpose *Clostridium histolyticum*, *Cl. septique*, *Cl. oedematiens* and *Cl. perfringens* were selected.

Since filtration through earthenware filters reduces the strength of the toxin, the organisms were grown for 48 hours in a medium consisting of Martin's broth to which brain pulp had been added and the test fluid was removed from the upper layers after centrifugation and standardized by the use of rabbits.

The tissue cultures were prepared from various embryo chick tissues, Ringer's solution or the heated toxin being used as controls.

It was found that, although *Cl. oedematiens* and *Cl. perfringens* toxins did not influence growth in the concentration used, yet the toxins of *Cl. septique* and *Cl. histolyticum* markedly checked the growth and emigration of fibroblasts and epithelial cells.—N. S. BARRON.

PIENING, C. (1932). Die anaerobe Sporenflora des getrockneten Schafdarmes. [**The Spores of Anaerobes occurring in Dried Sheep Intestines**].—*Zlb. Bakt. I.* (*Orig.*). **124.** 216-219. 2 tables. [3 refs.]

The author conducted an investigation into the incidence of spores of anaerobic bacteria in dried sheep intestines, the raw material for catgut manufacturing. The tests were made by means of Zeissler's culture method. In a total of 20 samples of English, Spanish and Argentine origin, the spores of the following anaerobes were found in the percentages of the samples given :—*Clostridium welchii* (100 per cent.), *Cl. oedematiens* (80 per cent.), *Cl. septique* (15 per cent.), *Cl. histolyticum* (5 per cent.), *Cl. sporogenes* (65 per cent.), *Cl. bifermentans* (90 per cent.), *Cl. tertium* (45 per cent.), *Cl. sphenoides* (15 per cent.), *Cl. multifermentans* (85 per cent.), *Cl. tetanomorphum* (5 per cent.), *Cl. tetani* (25 per cent.), *Cl. lichenoides* (10 per cent.).

The article concludes with a hint to catgut manufacturers that they must consider the risk of contamination and choose suitable methods of sterilization.

—R. WETZEL (HANOVER).

GILDEMEISTER, E., & SCHLOSSBERGER, H. (1932). Ueber die Wirkung des Toxins der Erreger der Gasbrandgruppe auf die Kaninchenhornhaut. [**The**

Irritant Action of Toxins from the Gas Gangrene Bacilli on the Cornea of the Rabbit].—*Zlb. Bakt. I.* (*Orig.*). **126.** 527-529. 1 table. [1 ref.]

To determine the action of toxins from certain members of the gas gangrene group of bacilli, the authors of the paper have prepared precipitated dried toxins from 24-hour liver broth cultures.

The minimal lethal dose was first established by intravenous injection into white mice and then dilutions of the various toxins were injected into the corneas of a series of rabbits : the eyes were removed for examination three days later. *Clostridium histolyticum* produced severe inflammation with perforation of the cornea ; *Cl. oedematiens* produced similar, but less severe changes ; *Cl. welchii* produced opacity of the cornea ; *Cl. septique* and *Cl. chauvoei* produced an inflammatory condition, but no definite formation of ulcers.

The authors conclude that these toxins show varying degrees of the same action and, from a comparison between the actions of these toxins on the cornea of the rabbit and their minimal lethal doses for mice, they consider that the necrotic factor is a distinct entity of the toxins and that it is characteristic for the species of bacillus concerned.

[This appears an unnecessarily painful procedure to adopt when this point has already been demonstrated by other methods].—A. J. Wilsdon.

Henderson, D. W. (1932). **Studies on** *Clostridium chauvoei*. **I. The Analysis of the " H " and " O " Antigens of** *C. chauvoei*. **II. Active Immunization with Pure " O " Antigen.**—*Brit. J. Exp. Path.* **13.** 412-420 and 421-427. 8 tables. [27 refs.]

I. By means of the agglutination reaction the author has studied the antigenic structure of *Cl. chauvoei*. The presence of a labile H antigen and a stable O antigen has been established. For the accurate differentiation of these antigens, the author recommends the use of separate flagellar (H) suspensions and steamed (O) suspensions. The O antigen is common to all the strains studied, but the H antigen appears to be complex.

II. In the previous paper it was shown that O antigen is common to all the strains of *Cl. chauvoei* examined, and this work was carried out with a view to finding the value of this antigen in the prophylaxis of blackleg. It has been shown that the O antigen is a good immunizing agent and produces complete cross-immunity against both bovine and ovine strains. The immunizing properties of the O antigen are not lowered by heating for periods of two hours at 100°C. This finding should prove of considerable value in the preparation of prophylactic vaccines in the field.—A. J. Wilsdon.

Schmiedhoffer, J. (1932). Schutzimpfung gegen Rauschbrand mit Formolvakzine nach Leclainche-Vallée. [**Protective Inoculation against Blackquarter with Leclainche-Vallée Formolized Vaccine**].—*Deuts. tierärztl. Wschr.* **40.** 545-547.

The author records a small number of laboratory tests and some field inoculations on a fairly large scale in which Tarozzi cultures were killed with 0·5 per cent. formol, the sterile fluid resulting, after clearing of sediment, being used as vaccine.

His findings agree with those of other and earlier investigators, that the formolized culture gives a stronger and more lasting immunity than culture freed from bacteria by filtration.—A. Leslie Sheather.

Weinberg, M., Davesne, J., & Haber, P. (1932). Sérum anti-Vibrion septique

anti-O ; son pouvoir préventif. [**The Preventive Power of Anti-*Clostridium septique* Anti-O Serum**].—*C. R. Soc. Biol. Paris.* **109.** 841-843.

WEINBERG, M., DAVESNE, J., & HABER, P. (1932). Les agglutinogènes du vibrion septique. Valeur comparative du sérum anti-O et du sérum antitoxique. [**The Agglutinogens of *Clostridium septique*. Comparative Value of Serum Anti-O and Antitoxic Serum**].—*Ann. Inst. Pasteur.* **49.** 303-318. 19 tables. [24 refs.]

WEIL and FELIX in 1917, working with *Proteus vulgaris*, demonstrated H or spreading colonies and O compact colonies. Anti-O serum agglutinated O antigen in small granules, anti-H agglutinated its antigen in coarse flocculi. Other authors confirmed these observations and showed that various other species of micro-organisms possessed like features. FELIX and OLITZKI in 1926 showed that the bactericidal power of specific serum rests in the O antibodies. FELIX and ROBERTSON in 1928 and 1930 showed that some species of the pathogenic anaerobes also possess two antigens H and O which stimulate the production of corresponding antibodies. With an anti-O serum obtained from the horse they studied, in mice, the preventive power against the inoculation of a lethal mixture of spores of *Clostridium septique* and calcium chloride and they stated that the injection of this antiserum protects mice against infection from the subsequent inoculation with spores, whilst an antitoxic serum only protected some of the inoculated animals.

Weinberg and his collaborators repeated the experiments of FELIX and ROBERTSON with *Cl. septique*. The results of their experiments with this organism confirm the presence of H and O agglutinogens which give rise to two different agglutinins, but they failed to demonstrate any superior protective power in anti-O serum as compared with an antiserum prepared from the living organisms. Weinberg and his co-workers see no reason as a result of their experiments to modify the technique of the preparation of anti-*Cl. septique* serum, because the titre of O agglutinins in a serum prepared with the living organisms is as high as that of serum prepared with organisms heated to 100°C. Even in cases where the anti-O serum protects all the animals against infection with *Cl. septique* its action was not found to be superior to that of a good antitoxic serum. They point out that their observations do not detract from the importance of the work of FELIX and ROBERTSON which has served to render more clear the mechanism of the preventive action of antibacterial sera.—S. H. GAIGER.

SÖRRENSEN, G. (1932). Bacillus gigas beim Rinde. [*Clostridium gigas* **in Cattle**].—*Deuts. tierärztl. Wschr.* **40.** 734-736. 5 figs. [2 refs.]

The article describes the isolation of an anaerobic sporulating bacillus from a bovine suffering from a gas gangrene type of infection to which the author gives the specific name of *gigas*. [The cultural and animal inoculation tests described only justify the designation of the organism as a member of the genus *Clostridium*].

—E. J. PULLINGER.

I. BAUDET, E. A. R. F. (1932). Recherches expérimentales sur les *Trichophyton* animaux à cultures faviformes. [**A Study of Faviform Trichophytons from Animals**].—*Ann. Parasitol.* **10.** 520-541. 3 text figs., 27 figs. on 5 plates. [11 refs.]

II. DAVIDSON, A. M., & GREGORY, P. H. (1932). **A Case of Kerion Celsi associated with Ringworm of the Eyelashes and accompanied by a Trichophytid.**—*Canad. Med. Ass. J.* **27.** 485-487. 3 figs. [6 refs.]

I. SABOURAUD in 1910 expressed the view that, when appropriate media were found, the faviform trichophytons would furnish fertile lateral hyphae

carrying spores. In 1920 LANGERON and MILOCHEVITCH demonstrated the formation of spindles and spirals, but no fructification. CATANEI in 1930 observed the formation of chlamydospores, chains of arthrospores and spore-bearing hyphae, using grains of wheat as a medium. This author was also able to confirm the observation of SABOURAUD and NEGRONI (1929) that *Achorion schoenleinii* is capable, on some media, of producing aleuria. CATANEI in 1929 drew attention to the favourable influence of bacteria and their products, especially staphylococci in media used for achorion and trichophyton. Baudet isolated five strains of trichophyton of the megalosporon type from animals, three being from cows, one from a horse and one from a goat. In culture all the strains were macroscopically and microscopically of faviform type. In primary cultures on glucose-agar the colonies were glabrous, but in subculture they became covered with a little down though microscopically preserving their faviform characters. On similar media, prepared from bouillon upon which staphylococci of human origin had been grown, aleuriospores were produced. Staphylococci of animal origin, however, did not promote fructification. Downy colonies and aleuriospores were obtained on potato and on carrot, and on agar with oleic acid with or without the addition of urea.

The author is of opinion that the term " faviform " trichophyton should no longer be used for strains of animal origin since the faviform character is merely due to the use of unfavourable media upon which these trichophytons are unable to exhibit fructification.

II. The authors record two cases of kerion associated with *Trichophyton album* in brothers aged four and six years, sons of a farmer who had many cases of ringworm amongst his cattle a few months previously. The probable source of this rare human infection was cattle. The parasite was of the large-spored type and belonged to Sabouraud's ectothrix group.—S. H. GAIGER.

TOMKINS, R. G. (1932). **The Action of Certain Volatile Substances and Gases on the Growth of Mould Fungi.**—*Proc. Roy. Soc. England. Ser. B.* **111.** 210-226. 11 figs., 1 table. [17 refs.]

The rate of germination and spread of various moulds has been examined when spores are inoculated into agar spread on the inside of the lid of a closed vessel containing solutions of volatile substances. It was found that the substances that inhibit germination of spores of mould fungi in certain concentrations may retard germination and growth in characteristically different ways when present in smaller concentrations.

Some substances, such as acetone, chloroform, ether, amyl formate and ethyl alcohol, do not affect the latent period of germination, but reduce the rate of spread of a colony to a lower steady rate of increase. Germination is inhibited completely by these substances in the same concentrations as those required to arrest growth.

Substances such as acetaldehyde, hydrogen cyanide and sulphuretted hydrogen, however, completely inhibit germination in a lower concentration than that required to arrest growth. Still lower concentrations of these substances will prolong the latent period of germination. The subsequent rate of spread of a colony is at first very slow, but it increases as the colony grows larger.

In the presence of ammonia the latent period of germination is progressively increased by increasing concentrations of the gas until a concentration is reached that both inhibits germination and arrests growth.

The periods of observation extended, at times, to over 200 hours. Temperature changes do not alter the nature of the effects described, but the lower the temperature the lower the concentration necessary to inhibit completely germination and growth.—W. R. WOOLDRIDGE.

Waters, R. (1932). **Mycotic Dermatitis in Sheep.**—*New Zealand J. Sci. & Tech.* **13.** 309-310. 1 fig. [4 refs.]

The occurrence of mycotic dermatitis in sheep in New Zealand is recorded. Microscopic examination of the characteristic exudate revealed dense masses of the mycelium of a fungoid micro-organism, and in all other respects the condition appeared to be identical with that reported under the name " lumpy wool " from South Africa, Australia and Tasmania. [See this *Bulletin*. **2.** 644].

—R. S. Roberts.

Virtanen, A. I., & Tarnanen, I. (1932). Die Sekretion und Thermostabilität der Bakterienproteinasen. [**The Secretion and Thermostability of Bacterial Proteases**].—*Zschr. physiol. Chem.* **204.** 247-258. 10 tables. [7 refs.]

A rapidly multiplying culture of whole young cells of *Pseudomonas fluorescens* secretes a protease into the surrounding medium. The protease was tested by examining its action on a casein solution. Similar results were obtained with *B. subtilis*. The bacterial mass contains little protease, but does contain a polypeptidase and a dipeptidase, which are not found in solution in a culture of young cells. These latter enzymes are only liberated from the cell on subsequent autolysis. It is concluded that the protease is actually secreted by the cell into the surrounding medium.

The protease is highly thermostable for an enzyme. In a protein-containing culture filtrate it will withstand boiling for many minutes and is not immediately destroyed at 110°C. In protein-free filtrates it is inactivated by heating for 30 minutes at 60°C. Proteins thus protect the enzyme. The thermostability of protein-free solutions of the enzyme is greatly increased by the addition of casein, but the degree of protection varies with the temperature. It is minimal at 60°C., but at temperatures over 70°C. it is very marked.—W. R. Wooldridge.

Tarr, H. L. A. (1932). **The Relation of the Composition of the Culture Medium to the Formation of Endospores by Aerobic Bacilli.**—*J. Hyg. Cambridge.* **32.** 535-543. 4 figs. on 1 plate, 5 tables. [14 refs.]

Endospore formation appears to vary inversely with the amount of available nutrient material in the medium. Amino-acids inhibit, but dilution of the media with inorganic salt solutions increases the degree of sporulation. Asparagine usually completely hinders spore formation.—Norman Hole.

Miessner, H., & Köser, A. (1932). Keimgehalt der Gebärmutter der Stute. [**The Bacteria of the Mare's Uterus**].—*Deuts. tierärztl. Wschr.* **40.** 561-566. 2 tables. [37 refs.]

The uteri of 67 non-pregnant mares were obtained at the abattoir immediately after slaughter. Cultures of the mucosa were made in an aseptic manner by searing areas of the bodies near the bifurcation and collecting material from inside with a platinum loop. Glucose blood agar and meat broth were used for culture.

In 53 of the above cases (79 per cent.) no bacteria were demonstrated. Of the remaining 14 cases, 7 showed cocci, 6 showed bacilli and one a mixture of both. The cocci included non-haemolytic streptococci, *Str. equi* and *Micrococcus albus*. The bacteria were of the aerogenes type. Macroscopically infected uteri showed some congestion which was more marked where *Str. equi* was the invader.

The examination of the uteri of living animals shortly after parturition was also attempted. Of the various methods tried for collecting material, Götze's shielded tampon-catheter was found the most successful for preventing contamination in the vagina or cervix uteri.

Of 582 cultural examinations carried out upon 349 mares, only 20 per cent. of cases were found to be free of bacteria. 26 per cent. were infected with *Bact. coli* and 22 per cent. with micrococci, whilst streptococci, *Bact. abortus equi* and other organisms occurred in lower percentages.

The difference of nearly 60 per cent. between the *post-mortem* and *in vivo* findings is explained by the difficulty of avoiding contamination when collecting samples from living animals, and also by temporary invasion of the uterus by saprophytes at parturition.

[Mares obtained at a city slaughterhouse are old animals or " cast offs " from transport stables. Such animals have not been used regularly for breeding purposes and cannot, therefore, be considered as entirely chance cases in the statistical sense].—E. J. Pullinger.

Pulley, H. C., & Greaves, J. D. (1932). **An Application of the Autocatalytic Growth Curve to Microbial Metabolism.**—*J. Bact.* **24.** 145-168. 24 figs., 2 tables. [4 refs.]

In this paper the authors apply the differential equation expressing the speed of a monomolecular autocatalyzed chemical reaction to their data on nitrate and carbon dioxide accumulation.

A formula is given defining " the progress of nitrate accumulation by mixed cultures of soil bacteria and of carbon dioxide by pure cultures of *Saccharomyces cerevisiae* and by commercial yeast cultures."

Graphs showing the application of the above formula to experimental data are included.—Gwilym O. Davies.

DISEASES CAUSED BY PROTOZOAN PARASITES.

I. Yakimoff, W. L., Iwanoff-Gobzem, P. S., & Buewitsch, B. I. (1932). Zur Frage der Infektion der Tiere mit heterogenen Kokzidien. II. Mitteilung. [**Infection of Animals with Heterogenous Coccidia. Part II**]. —*Zlb. Bakt. I.* (*Orig.*). **125.** 469-472. [10 refs.]

II. Yakimoff, W. L., Gousseff, W. F., & Rastegaïeff, E. F. (1932). Zur Frage der Kokzidien der Rinder in Usbekistan (Mittelasien). [**The Coccidia of Cattle in Usbekistan (Middle Asia)**].—*Ibid.* **126.** 111-118. 9 tables. [12 refs.]

I. In support of the results published in a previous article [(1931). *Zlb. Bakt. I.* (*Orig.*). **122.** 319.] the authors failed to infect animals with heterogenous coccidia. Thus, they could neither infect rabbits with sheep coccidia nor bovines or poultry with rabbit coccidia. In each case the non-specific coccidia passed quickly through the alimentary tract without causing any disturbance.

II. The examination of faeces from 126 cattle in Turkestan showed that coccidia were present in 54·7 per cent. of the cases. They belonged to four types :—*Eimeria smithi*, *E. ellipsoidalis*, *E. zürni* and *E. lukidnonensis*, the predominant type being the first named. The differential characters of each type are described and the authors state that there is sufficient distinction between *E. smithi* and *E. ellipsoidalis* to allow their being called two distinct types.—S. J. Edwards.

Marchoux, E., & Chorine, V. (1932). La fécondation des gamètes d'hématozoaires. [**The Fertilization of the Gametes of Haematozoa**].—*Ann. Inst. Pasteur.* **49.** 75-102. 2 figs., 8 tables. [23 refs.]

The authors survey the progress of the study of the life history of the malarial

parasites, before entering on the description of their experiments and observations connected with the process of fertilization of the parasites. Their material was derived from pigeons infected with *Lynchia maura* which they obtained from Algeria. Temperature was found to have a determining effect upon the process.

Working with a microscope entirely enclosed in a chamber, the temperature of which could be controlled, they found that fertilization was accelerated as the temperature rose to about 36°C., and that at higher temperatures it was slowed down. Ookinetes were formed between 20° and 23°C., but they degenerated at 37°C. and temperatures above that. Experiments designed to test the question whether concentration of the liquid containing the parasites had any influence upon the process, showed that it had not. The addition of salt at a concentration of more than 1 per cent., however, did produce a marked retardation. At a concentration of about 1 per cent. it appeared to be without effect.

Anticoagulants such as potassium oxalate and sodium citrate did not prevent fertilization in certain concentrations. One per cent. potassium oxalate, and 1·5 per cent. potassium citrate in 0·5 per cent. sodium chloride appeared to be the strengths most favourable to the process. Carbon dioxide has an inhibiting effect upon fertilization. Liberation of this gas from the blood will cause the pH to rise from 7·38 to 7·75 in five minutes. Gametes were not liberated until the pH of the blood stood at 7·55. Oxygen is not necessary for the process, and it can take place in an atmosphere of hydrogen.

Quinine hydrochloride delays fertilization in a dilution of 1 : 10,000, and stops it almost completely at 1 : 1,000. Dilutions of 710 Fourneau and of plasmoquine act in a similar manner.—A. Leslie Sheather.

Nattan-Larrier, L., & Noyer, B. (1932). Infection expérimentale du Rat par le Trypanosome du Hamster. [**The Experimental Infection of the Rat with the Trypanosome of the Hamster**].—*C. R. Soc. Biol. Paris.* **111.** 887-889. [1 ref.]

Rats cannot be infected with *Trypanosoma rabinowitchi* by direct inoculation from hamsters, either by subcutaneous or intraperitoneal inoculation. Infection of rats was produced by the intraperitoneal inoculation of cultures. In the first series of experiments, old cultures of the third generation grown on rabbit blood-agar were used and 75 per cent. of new-born rats became infected. The intraperitoneal inoculation of blood from these rats into fresh rats produced some infections, but later subinoculations were unsuccessful. In the second series of experiments, cultivation was carried out on rat-blood agar and subinoculations were performed by inoculating peritoneal fluid intraperitoneally. In this series infection was produced up to the sixth passage from rat to rat.—U. F. Richardson.

Nattan-Larrier, L., & Noyer, B. (1932). Le trypanosome du debab égyptien. (*2e note*). [**The Trypanosome of Egyptian Debab. 2nd Note**].—*Bull. Soc. Path. exot.* **25.** 748-755. [1 ref.]

The authors continued their investigations regarding the camel disease known as " el debab," and their special object, as recorded in the present publication, was to institute some comparisons between the disease as it occurs in Egypt and as it occurs in Morocco and Algeria.

In a small number of experiments it was found that the diseases had this factor in common, viz., that transmission of the trypanosome to the foetus could take place. It appears to be necessary that trypanosomes should be numerous in the blood of the dam at the time of parturition if the infection of the foetus is to take place.

Parallel series of experiments with the Egyptian and Moroccan strains of the " debab " trypanosome, and with the equine trypanosome of Morocco tended to show that the first named was less susceptible to the action of human serum than the other two.

Employing the technique which they have already described in their experiments regarding the serological differentiation of the trypanosomes occurring in horses and camels in Morocco, the authors found that " anti-debab " serum of Moroccan origin was without action on the Egyptian strain of trypanosome, and further that the converse experiment produced a similar result. In other words, the antiserum produced by each type of trypanosome was without effect upon the other.

Moreover, tests were carried out with a strain of *Trypanosoma evansi* derived from Mauritius and the antisera of *T. evansi* and *T. morocanum* were inactive against the heterologous trypanosomes.

The authors conclude that the trypanosomes of " el debab " in Egypt and Morocco are not indentical, and they consider that the parasite of the Egyptian disease is a separate species comparable to *T. morocanum* or *T. berberum*. They propose the name *Trypanosoma aegyptium*, in spite of the objections, which they realize exist, to the multiplication of species.—A. Leslie Sheather.

von Brand, T., Regendanz, P., & Weise, W. (1932). Der Milchsäuregehalt und die Alkali-reserve des Blutes bei experimentellen Trypanosomeninfektionen. [**The Lactic Acid Content and the Reserve of Alkalinity of Blood in Experimental Trypanosome Infections**].—*Zlb. Bakt. I.* (*Orig.*). **125.** 461-468. 5 tables. [13 refs.]

This article discusses the suggestion that death in trypanosomiasis is due to acidosis produced by the action of trypanosomes in breaking down the blood sugar with the production of lactic acid and an exhaustion of the glycogen reserve of the body.

The experiments recorded were conducted on experimentally infected rats which were killed by decapitation in order to avoid the muscular defence movements which occur when an anaesthetic is used and which influence the acid-base equilibrium of the blood.

The experiments indicated that, in rats, an agonal or pre-agonal increase in blood lactic acid occurred which was accompanied by a decrease in the reserve of alkali. The reaction was not characteristic, but also occurred in bartonella infections. In rabbits there was an increase in lactic acid, but no decrease of alkali.

By a comparison *in vitro* of the changes in normal blood and in blood from a case of trypanosomiasis, no indication was obtained that the trypanosomes had any power of producing lactic acid.—U. F. Richardson.

Lucas, Miriam S. (1932). **A Study of** *Cyathodinium piriforme*. **An endozoic protozoan from the intestinal tract of the guinea-pig.**—*Arch. Protistenk.* **77.** 64-72. 5 figs. on 1 plate, 3 tables, 1 graph. [8 refs.]

Dogiel, V. (1932). Beschreibung einiger neuer Vertreter der Familie Ophryoscolecidae aus afrikanischen Antilopen nebst Revision der Infusorienfauna afrikanischer Wiederkäuer. [**Describing Some New Members of the Ophryoscolecidae Family from African Antelopes and a Revision of the Infusorian Fauna of African Ruminants**].—*Ibid.* 92-107. 5 figs., 2 tables. [2 refs.]

The first paper describes a ciliate encountered in large numbers in the caecal contents of guinea pigs. 52 per cent. of guinea pigs at Pennsylvania University

and at Saint Louis were affected. A description of the histological structure of the parasite is given and it is noted that conical and piriform types appear together in the same host.

The second paper describes ciliates from the stomach and intestines of African antelopes, the material having been collected in Uganda by C. A. Hoare. Species of *Entodinium* and *Ostracodinium* are described from kob, buffalo, waterbuck, situtunga and blue duiker. A revised list is given of the ciliate parasites of Uganda cattle.—U. F. Richardson.

Ayyar, V. K. (1932). **A Note on an Outbreak of Leptospiral Jaundice among the Madras Hounds.**—*Ind. J. Vet. Sci. & Anim. Husb.* **2.** 160-165. 7 figs. on 4 plates, 1 table, 1 chart. [2 refs.]

Out of 29 hounds belonging to the Madras Hunt Club subjected to a *post-mortem* examination, one hound showed leptospira in ground-up liver and kidney tissue examined by dark ground illumination. In two of the guinea pigs inoculated from this case, leptospira were found, though some other guinea pigs which died showed lesions resembling leptospiral infections. The author regards the outbreak amongst the hounds as due to *Leptospira icterohaemorrhagiae*.—S. H. Gaiger.

DISEASES CAUSED BY VIRUSES.

Jezic, J. A. (1932). Gibt es eine Pluralität des Schafpockenerregers? [**Is there a Plurality of the Sheep Pox Virus?**]—*Zschr. Immun.-Forsch.* **75.** 456-468. 4 tables. [7 refs.]

Five strains of sheep pox virus obtained from Algeria, Tunis, Bulgaria, Greece and Yugoslavia (Dalmatia) were tested by cross-immunity experiments. Each strain produced a definite immunity against reinfections with the four other strains. The plurality of the sheep pox virus therefore is denied by the author.

The single strains showed marked differences from each other in so far as the quantity of virus required for artificial infections was different.

—R. Wetzel (Hanover).

Mélanidi, C., Tzortzaki, N., & Débonéra, G. (1933). Sur la spécificité de la réaction claveleuse expérimentale chez le Cheval. [**The Nature of the Response of the Horse to Sheep Pox**].—*C. R. Soc. Biol. Paris.* **112.** 15-16. [2 refs.]

The authors have succeeded in producing an anti-sheep pox serum by the hyperimmunization of the horse. They claim that 6·0 c.c. of this serum completely neutralized 1·0 c.c. of undiluted sheep pox virus and that lambs inoculated simultaneously with serum and virus were completely immune to a large dose of virus given 15 days later.—R. E. Glover.

le Louet, G. (1932). La peste bovine en Indochine en 1931. [**Rinderpest in Indo-China in 1931**].—*Bull. Off. internat. Epiz.* **6.** 449-460. 2 graphs.

Severe outbreaks of rinderpest occurred in Annam, Tonkin, Cochin-China and Cambodia during 1929 to 1931, but eradication was effected in all districts except Cambodia by the end of 1931.

Outbreaks in Annam were of a virulent type whilst in the other districts the disease was benign. In Annam the situation was peculiar as widely scattered outbreaks occurred and it is thought that the main cause of spread in this district was traffic in pigs sent by rail for slaughter.

In 1931 the use of serum was largely discontinued in favour of formolized vaccines, which confer a longer immunity and are inoffensive as regards possible spread of virus. In 1931, 245,045 doses of vaccine were used in the treatment of 120,000 animals. In disease-free areas no mortality occurred from vaccination whilst in infected areas the mortality in cattle after vaccination varied from 1 to 8 per cent. and in buffaloes from 3 to 18 per cent.

It is noted that in Cochin-China the colonists were violently opposed to vaccination at first, but that this opposition was gradually overcome.

—U. F. Richardson.

Fischer, D. (1932). A sertéspestic elleni szérumos és szimultán ojátsok szérumadagjai. [**Dosages of Swine Fever Serum for Use in Serum and Simultaneous Inoculations**].—*Allategészségügy*. **12.** 71-72. [Abst. from English translation].

In the preventive serum-alone inoculation against swine fever, the author prefers to give a dose larger than that advised by the manufacturers, in order to be on the safe side.

Whilst the prescribed dose is sufficient for swine that are still free from infection, it is not so for those already infected, in the beginning of the incubation period, when no symptoms of illness are yet evident. For these a larger serum dose is indicated.—J. E.

Manninger, R. (1932). Untersuchungen über Schweinepest und Ferkelparatyphus. [**Studies on Swine Fever and Paratyphoid of Young Pigs**].—*Deuts. tierärztl. Wschr.* **40.** 113-120. 1 table, 8 charts. [6 refs.]

While it is generally recognized that a septicaemia due to *Bact. suipestifer* may complicate the swine fever virus infection, there appears to be little doubt that a disease may occur in pigs which is due to the bacillary infection alone. Paratyphoid of pigs is a disease due to infection with *Bact. suipestifer* and generally occurs in young animals less than six months old. The author cites cases of young pigs dying off in herds after inoculation with anti-swine fever serum, the mortality being due to infection with the bacillus under discussion. The following experiment is also of interest :—

(1) A 20 c.c. dose of a filtrate prepared from a suspension of the organs of a pig suffering from the disease described as paratyphoid was inoculated into a susceptible pig ; no reaction followed and no immunity could be demonstrated to a 5 c.c. dose of a filtrate, prepared from the organs of a pig suffering from infection with swine fever virus, given 11 days later ; the pig developed swine fever and died.

(2) A 10 c.c. dose of an unfiltered suspension of the organs of a pig which had died as a result of the acute paratyphoid infection was inoculated into another pig ; 17 days after this pig had recovered from the paratyphoid infection induced by the injection (*Bact. suipestifer* was recovered from the blood), it was reinoculated with 1 c.c. of the blood taken from a pig suffering from infection with swine fever virus. In this case also the animal developed swine fever and died.

The clinical picture of swine fever, which occurs more often in pigs over six months old, may be that of a pure virus infection or that of the virus infection complicated by a bacterial septicaemia. Charts are given showing the temperature curves typical of the pure virus infection. Two charts are also given to illustrate the temperature curve with a double peak, characteristic of cases of swine fever complicated by a bacterial septicaemia due to *Bact. suipestifer*. A primary rise of temperature reaching a maximum about the fifth or sixth day occurs, followed by a fall nearly to normal and a secondary rise in three or four days. The primary

rise is believed to be due to the virus infection and the second rise to the secondary or bacterial invader.

The differential diagnosis of the two diseases is fraught with many difficulties. The incubation period of both appears to be similar, about three to four days. In acute paratyphoid infection the lesions are chiefly haemorrhagic and the lymphatic glands are especially affected. The spleen is congested and hypertrophied and *Bact. suipestifer* may be recovered from the blood and organs.

In cases of swine fever complicated by a bacterial septicaemia, the spleen is also swollen and haemorrhagic, but in the pure virus infection this is not the case. It must also be borne in mind that *Bact. suipestifer* may also be recovered from cases of swine fever complicated by a bacterial septicaemia. The age of the animal must be taken into account. If a negative bacterial result is obtained in animals over six months old, a pure swine fever infection is indicated. Pigs suffering from the virus infection complicated by the bacterial invasion generally die earlier than those suffering from the pure virus infection.

Swine fever is usually diagnosed by the finding of such lesions as croupous pneumonia and the " button " ulcers in the caecum and small intestine. The general impression received, however, from the observations on the lesions found on autopsy in field and experimental cases is that these are of little real value in determining the nature of the infection being dealt with and that resort must be made to bacteriological methods.—I. A. GALLOWAY.

STEYN, D. G. (1932). **East African Virus Disease in Pigs.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 99-109. 3 tables. [4 refs.]

The author studied a disease of pigs in the Transvaal which he believes to be identical with the East African swine fever described by MONTGOMERY (1921) in Kenya. The virus was non-pathogenic in decomposed citrated blood after storage in an ice chest for periods of 70 and 84 days. Blood collected aseptically and mixed with glycerol-oxalate remained viable for one year in an ice chest.

Steyn confirmed MONTGOMERY'S observation that infection does not persist in sties for as long as five days. Attempts to confer immunity by means of bile, yatren and bile, formolized virus, and serum-virus were unsuccessful.

Two domestic pigs inoculated subcutaneously with the blood of a wart hog which had been shot contracted the disease and their blood remained infective for two months after recovery.

Steyn claims that apparently healthy wart hogs in areas in which the virus disease occurs are " carriers " of infection.

[East African swine fever was first reported by MONTGOMERY in 1921—*J. Comp. Path. & Therap.* **34.** 159 and 243—and proved by him to be caused by a filtrable virus. Although the question of the relationship between this disease and the swine fever which occurs in Europe and America has not been definitely settled, there is considerable evidence that the two viruses are separate entities. MONTGOMERY stated that, as far as his work had progressed, he preferred to regard the East African virus as a strain of swine fever virus possessing particularly virulent characters. The African virus was also studied by WALKER and STOCKMAN who found that pigs immune to the European virus were susceptible to the East African virus].—T. M. DOYLE.

I. ABADJIEFF, B. (1932). Die Tollwutbehandlung in Bulgarien nach der Methode von Högyes-Phillips. [**Rabies Treatment in Bulgaria by the Högyes-Phillips Method**].—*Zschr. Hyg. u. Infektkr.* **113.** 406-410.

II. Abadjieff, B. (1932). Tollwut-Yatrenvaccine. [**Rabies-Yatren Vaccine**]. —*Ibid.* 582-585. 1 diagram. [2 refs.]

I. The Högyes-Phillips method of vaccination was employed in various stations in Bulgaria from the 1st April, 1929, until the 1st January, 1931. [This is a combination of the dilution method of Högyes with the glycerol preservation method of Calmette. The technique of the preparation of the vaccine is described ; for fuller details see Boecker. (1926). *Zschr. Hyg. u. Infektkr.* **106.** 151]. A total of 2,484 bitten persons was treated and of these two died of rabies, a mortality of 0·08 per cent. No cases of post-vaccinal paralysis are recorded.

II. In a previous communication [(1928). *Zlb. Bakt. I.* (*Orig.*). **107.** 202.] the author stated that fixed rabies virus was inactivated by a 5 per cent. solution of yatren at 37°C. in three hours. In the present paper he reports the results of the treatment, during the period from the 1st September, 1930, to the 1st September, 1931, of 2,930 bitten persons, with a yatren vaccine prepared by the method described below. Of these, four died (0·13 per cent.). A single case of post-vaccinal paralysis of a transient type was observed.

The technique employed for the preparation and administration of the vaccine is as follows :—a 10 per cent. emulsion of infective brain and cord is prepared in 4 per cent. yatren solution. This mixture is kept at 37°C. for 24 hours, tested for sterility, diluted 1 : 4 in a 2 per cent. solution of yatren and then filtered through gauze before distribution in ampoules. The sterility of 5 per cent. of the ampoules is controlled. The vaccine so prepared is employed up to a period of three months after manufacture. The vaccine is inoculated subcutaneously in the abdominal region in 15 daily doses progressively increasing from 0·25 c.c. to 2·5 c.c. Patients with head or especially deep wounds receive a further three injections of 3, 3, and 4 c.c. The amount of brain substance administered, therefore, varies from 440 to 700 mg.—I. A. Galloway.

Jackson, C., & Neitz, W. O. (1932). **On the Aetiology of Heartwater.**— *18th Rep. Direct. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 49-70. 14 figs., 2 tables. [18 refs.]

The evidence which has been put forward by Cowdry and others in support of the belief that *Rickettsia ruminantium* is the cause of heartwater is far from convincing. More recently Jackson [see this *Bulletin.* **2.** 381.] has indicated a method of demonstrating *Rickettsia* in the endothelial lining of large blood vessels.

In order to obtain more conclusive information of the role played by *R. ruminantium*, the authors obtained endothelial cell material from heartwater-infected sheep by washing out blood vessels with sterile saline and then opening and scraping them with aseptic precautions. Intravenous and subcutaneous inoculation of endothelial cell emulsion produced typical heartwater in a certain percentage of cases.

Massive blood transfusion from sheep at the height of heartwater reactions into susceptible sheep produced no reaction. This rules out the possibility of intoxication playing any part in the pathogenesis of heartwater. The authors were unable to show that the morphology of the *Rickettsiae* had any significance in the pathogenesis of the disease or upon the distribution in the tissues.

Various hypotheses dealing with the aetiology of heartwater are discussed. The conclusion reached is " that there is no virus of heartwater as distinct from *Rickettsia*, but that the latter actually circulates in the blood in the form of single organisms probably lying free in the plasma." Nevertheless it is true that *Rickettsia* may have an ultravisible stage. The authors claim to be able to demon-

strate single *Rickettsiae* in the blood. They admit that difficulty arises in distinguishing these organisms from débris or Jolly bodies, but consider that the ring-form of *Rickettsia*, which frequently occurs, should easily be recognized. Photomicrograph illustrations support this contention.—E. J. Pullinger.

Canham, A. S. (1932). **Immunisation of Fowls against Fowl Pox by use of Pigeon Pox Virus.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. pp. 111-140. 3 figs., 7 tables. [14 refs.]

The author tested the value of pigeon pox virus for the immunization of birds against fowl pox. Various methods of preparing the vaccine were tried, the best results being obtained with a 1 per cent. suspension of powdered crusts in 80 per cent. glycerol saline.

He found that pigeon pox vaccine conferred a good immunity against natural infection and an incomplete immunity against artificial infection with fowl pox.
—T. M. Doyle.

I. Seddon, H. R., Hutchison, J. K., & Murphy, W. J. B. (1932). **Vaccination against Fowl Pox. Results of Field Trials extending over Three Years.**—*Austral. Vet. J.* **8.** 172-180. 4 tables. [1 ref.]

II. Michael, S. T. (1932). **Results with Pigeon Pox Virus for the Immunization of Fowls against Chicken-Pox.**—*J. Amer. Vet. Med. Ass.* **81.** 319-324. 1 fig., 1 table. [7 refs.]

I. The authors record the results of vaccination against fowl pox with a live vaccine. The vaccine consisted of fowl pox crusts, collected between the 14th and 16th day from the combs of artificially infected fowls, dried for 24 hours in an incubator at 37°C. and then reduced to powder. The disadvantages inherent in live fowl pox vaccine were to a great extent overcome by storing the powdered crusts for six to twelve months in a refrigerator ; the optimum period of storage appeared to be from four to six months.

The vaccine, which consisted of a 1 : 1,000 suspension of dried stored powder in normal saline, was subjected to two potency tests, one immediately the crusts were dried and the second before distribution of the dried stored virus. The tests were made by inoculating fowls with falling dilutions of the virus.

Carefully controlled field tests of the vaccine were made over a period of three years and excellent results were obtained.

II. Michael tested the immunizing value of pigeon pox virus against both artificial and natural infection with fowl pox. The vaccine, in his hands, proved valueless.

[It is possible that, if the technique as used in Europe for the preparation of the vaccine had been followed more closely, different results would have been obtained. The low concentration of virus in the vaccine used, its storage in the liquid state and the addition of antiseptic are factors which probably affected adversely its antigenic value].—T. M. Doyle.

Badger, L. F. (1932). **Rocky Mountain Spotted Fever (Eastern Type). Virus Recovered from the Dog Tick *Dermacentor variabilis* found in Nature.**—*Publ. Health Rep. Washington.* **47.** 2365-2369. 4 tables. [3 refs.]

A dog tick, *Dermacentor variabilis*, obtained from a farm where a case of Rocky Mountain spotted fever (eastern type) had occurred, was found to carry the virus. Strains of virus indistinguishable from stock strains on clinical, pathological and immunological grounds, were obtained both by allowing the tick to feed on guinea pigs and by inoculating an emulsion of the tick.—Norman Hole.

COLVIN, M. G. (1932). **Relationship of Bacteriophage to the Natural and Experimental Diseases of Laboratory Animals, with Special Reference to Lymphadenitis of Guinea-pigs.**—*J. Infect. Dis.* **51.** 17-29. 4 tables. [20 refs.]

A bacteriophage which lysed the haemolytic streptococcus isolated from a submental abscess in a guinea pig was recovered from sewage and raised to a maximal activity by passage in cultures. In broth cultures this phage apparently produced complete and permanent lysis. The titre of the phage in broth culture was $1:10^{-7}$. [Its titre was, therefore, apparently somewhat lower than that of other phages which have been recovered and proved active against virulent streptococci. CLARK, P. F., and CLARK, Alice S.—(1927). *Proc. Soc. Exp. Biol. New York.* **24.** 635.—recovered a phage from sewage active against a virulent streptococcus from the rabbit in a titre of $1:10^{-9}$ and even, occasionally, in a titre as high as 1×10^{-13}].

No actual plaques were produced by the phage in plate cultures of the lymphadenitis streptococcus from the guinea pig, but the colonies became transparent. Plaques were observed in plate cultures of a human streptococcus against which the phage was active.

This phage was used in attempts to modify the course of the disease in guinea pigs with little or no success. No curative effect was observed in treatment by the phage and suggestive evidence was obtained that its use might even prove harmful. [The use of bacteriophage for therapeutic treatment is complicated by the toxic elements from the metabolism and cleavage of the bacteria which must exist in lysed cultures].

The results obtained suggested that the action of bacteriophage, within the tissues, may be hindered by the conditions obtaining therein and be at variance with the activity demonstrable *in vitro*. The adaptation of the phage to a serum medium, before use, *in vivo*, did not appear to affect the issue.—I. A. GALLOWAY.

I. SHOPE, R. E. (1932). **A Transmissible Tumour-Like Condition in Rabbits.**—*J. Exp. Med.* **56.** 793-802. 9 figs. on 4 plates. [1 ref.]

II. SHOPE, R. E. (1932). **A Filtrable Virus Causing a Tumour-Like Condition in Rabbits and its Relationship to Virus myxomatosum.**—*Ibid.* 803-822. 7 tables. [10 refs.]

I. A fibromatous growth found in a wild cotton-tail rabbit was transmitted through a series of laboratory rabbits, at first by placing pieces of the tumour under the skin or in the testicle, later, by subcutaneous and intratesticular inoculation of ground-up tissue. Intraperitoneal, intravenous and intracerebral injections failed and the intramuscular route was uncertain. The condition is not contagious.

The tumour as induced in the laboratory rabbit differed from the original in that proliferation and degeneration of the epidermis covering the tumour did not occur. Leucocytic invasion was a feature of both the natural and experimental tumours. There were never any metastatic growths and none of the animals showed any constitutional disturbance.

The original tumour was reproduced exactly in a wild cotton-tail rabbit after eight serial passages through laboratory rabbits and was still intact 77 days after inoculation, whereas the tumour in the laboratory animal had usually disappeared in about 35 days.

Attempts to transmit the growth to guinea pigs, white rats, white mice and chickens were unsuccessful.

II. The tumour-producing agent resisted the action of glycerol and passed the Berkefeld V, N and W filters.

Rabbits immunized against the tumour were partially or completely immune to infectious myxoma and, conversely, rabbits immune to infectious myxoma were immune to tumour virus. Tumour formation was essential for immunization. Sera from tumour-immune rabbits neutralized tumour virus, but not infectious myxoma virus unless the animals had also been inoculated with *Virus myxomatosum*. Wild cotton-tail rabbits inoculated with *Virus myxomatosum* did not develop lesions, but became resistant to tumour virus. Sera from such immune rabbits failed to neutralize either myxoma or tumour virus.

The tumour virus is possibly an adapted strain of myxoma virus.

—George Slavin.

INVERTEBRATE VECTORS OF DISEASE.

I. Taylor, A. W. (1932). **Pupal parasitism in *Glossina morsitans* and *G. tachinoides* at Gadau, Northern Nigeria.**—*Bull. Entomol. Res.* **23.** 463-467. 1 fig., 2 tables. [7 refs.]

II. Pomeroy, A. W. J., & Morris, K. R. S. (1932). **The Tsetse Problem on the Eastern Cattle Route in the Gold Coast.**—*Ibid.* 501-531. 7 figs. on 2 plates, 6 tables, 8 charts, 3 maps. [12 refs.]

I. The author records the results of his examination of pupae of *G. morsitans* and *G. tachinoides* in the Sherifuri-Gadau area of Northern Nigeria. He is led to the conclusion that the bombyliid *Thyridanthrax argentifrons* is the only pupal parasite of importance in this area, by far the greatest total rate of emergence being 6 per cent. from *G. tachinoides* in March, and 2 per cent. from *G. morsitans* in April. He states that pupal parasites which are found in the Gold Coast have not been recorded in Nigeria in similar ecological conditions and it is thought that their distribution may be more localized than is realized. Additional evidence is proffered indicating that *G. morsitans* and *G. tachinoides* breed chiefly in the dry season in Nigeria.

II. On this cattle route the only tsetse of economic importance which were found were *G. morsitans* and *G. tachinoides*. Standardized clearings 20 yards wide and half a mile long were made at various places alongside streams on the cattle route and the results observed are recorded. An account of the terrain is given which includes climate, flora, fauna and geology.

It is advocated that a survey of the plant community should be carried out before clearing is begun as it was found that in some cases the re-overgrowth was favourable to tsetse flies and sometimes was inimicable to them. The paper is concluded by notes on the bionomics of nine species of tsetse found in the Gold Coast.

In an appendix Morris gives the results of his work at Makongo (Gold Coast). As in the actual paper, the physical and biological characters of the district are given in considerable detail and the results of clearing recorded. It is tentatively suggested that a suitable regrowth after clearing might be used as a barrier to tsetse flies and also that alteration of the nature of the plant community by clearing might lead to the eradication of primary foci of infection. The paper and appendix will repay study by those working in similar ecological conditions.

—Edward F. Peck.

Musgrave, A. (1932). **Some Australian Ticks.**—*Austral. Mus. Mag.* **4.** 316-323. 8 figs. [4 refs.]

The writer in a popular article on six species of Australian ticks gives details

of their life histories and occurrences. A short description is given of " tick paralysis " with suggestions for its treatment, which are mostly of lay origin.

The paper is largely composed of quotations from other writers on the subject.—J. S. Steward.

Macleod, J. (1932). **The Bionomics of *Ixodes ricinus* L. the " Sheep Tick " of Scotland.**—*Parasitology*. **24.** 382-400. 3 tables, 4 charts, 1 map. [14 refs.]

" *Ixodes ricinus* is recognized as a major scourge of farm stock in Britain, and in England and North Europe it is the vector of a small piroplasm causing red-water in cattle."

In sheep it has been shown to transmit louping-ill and a " tick-borne fever." After describing his methods and technique and the observations of other authors, the writer gives details of the occurrence and distribution of *Ixodes ricinus* in Scotland, with particulars of its bionomics. A sex ratio in adults of 9 females to 5 males is mentioned and the longevity of unfed adults is stated to be 21 months; larvae were able to feed after fasting for 15 months and nymphs after 13 months.

The tick appeared on sheep early in March and increased in numbers during April to May ; the numbers decreased from June to late August when a slight temporary increase occurred. By the middle of November no ticks could be found on sheep.

This tick has been taken on the following hosts :—sheep, horse, cattle, deer, hedgehog, dog, fox, cat, stoat, weasel, ferret, hare, rabbit and squirrel, and immature stages have also been taken on various birds.

Variations in the susceptibility of sheep to infestation appeared to be correlated with their condition.

The optimum air temperature for this tick appeared to be from 45° to 60°F.

—J. S. Steward.

DISEASES CAUSED BY METAZOAN PARASITES.

Causey, O. R. (1932). **Sterilization and Growth of the Eggs and Larvae of the Blowfly.**—*Amer. J. Hyg.* **15.** 276-286. 1 table. [32 refs.]

While on active service during the Great War, Baer noticed that wounds infested with certain blowfly larvae became surgically clean and healed more quickly than those protected from fly larvae infestation. As the result of this observation, a successful treatment of stubborn cases of osteomyelitis with blowfly maggots was evolved.

The writer of the article gives an interesting historical review of the controversy as to whether the digestion of food and the growth of higher animals is dependent upon the activities of bacteria and yeasts. He mentions that Glaser (1924) was unable to grow sterile larvae on meat that had been subjected to sterilizing temperatures, but that, on the addition of yeasts, bacteria or plant and animal juices, the larvae occasionally reached maturity. Causey, therefore, suspected that the bacteria not only acted as readily available food, but also split the medium upon which the larvae grew into simpler compounds.

In the course of the investigation described, he found that rat embryos, removed aseptically by caesarean operation and embedded in nutrient agar, constituted an adequate medium for the development of sterile blowfly larvae hatching from blowfly eggs that had been sterilized with a mercuric chloride-alcohol, acid compound : also that sterile flies produced from aseptic larvae could be maintained in an aseptic environment for at least two weeks. It was hoped by

this technique to avoid the danger of introducing into wounds organisms with which the blowfly larvae could not cope.—Ll. E. W. Bevan.

I. Holdaway, F. G. (1932). **Fly Strike of Sheep : A Natural Phenomenon.**—*J. Sci. & Indust. Res. Australia.* **5.** 205-211. [31 refs.]

II. Miller, D. (1933). **The Bucco-Pharyngeal Mechanism of a Blow-Fly Larva** (*Calliphora quadrimaculata* **Swed.).**—*Parasitology.* **24.** 491-499. 12 figs. on 2 plates. [8 refs.]

I. Holdaway summarizes and discusses the theories which have been advanced concerning the fly problem in Australia. The theory of Johnston [(1923). *Trans. Roy. Soc. S. Australia.* **47.** 201.] that strike is associated with bacterial activity in the wool, is considered to be proved and the study of conditions in the wool favouring or inhibiting bacterial activity thus becomes important. For bacterial activity the two most important requirements are moisture and a suitable nutrient medium. In " body strike " adequate moisture is supplied by rain and wet grass, aided by dull or humid weather, and in " crutch strike " the moisture is supplied by wet faeces and, in female sheep, by urine.

II. Miller gives a detailed account of the structure and mechanism of the bucco-pharyngeal apparatus of the larva of *Calliphora quadrimaculata* for details of which the original article should be consulted.—J. S. Steward.

Young, W. J. (1932). **The Sheep Maggot Fly.**—*Vet. J.* **88.** 138-140.

The author states that in many districts this insect (*Lucilia sericata*) makes greater demand upon the time of flock masters and shepherds than all the other ailments of the flock combined. It is generally most troublesome during close, muggy, thundery and showery weather ; May and June are considered to be the worst months. He expresses the opinion that veterinary surgeons should be capable of picking out animals that are attacked and should be conversant with the appearance of the skin after treatment, in order to differentiate the lesions from those of sheep scab.

A description of the fly and its life-history are given, and the symptoms of " struck " sheep described. Preventive and remedial measures are recommended.
—Ll. E. W. Bevan.

Gogate, B. S. (1932). **On a New Species of Trematode** (*Prohemistomum serpentum* **n. sp.) from a Snake, with a Note on an Immature Species of** *Heterechinostomum* **Odhner from the Cat.**—*Parasitology.* **24.** 318-320. 2 figs. [6 refs.]

The new species of *Prohemistomum* is fully described and the author gives an account of some immature specimens of *Heterechinostomum magnovatum* which were found in the intestine of a cat ; they differed from the descriptions of all the species of the genus in having 24 spines in the collar instead of 20 to 22 as given by Odhner (1910). The generic diagnosis should, therefore, be altered to " 20 to 24 collar spines."—E. L. Taylor.

Ortlepp, R. J. (1932). **On a New Species of** *Tetrameres* (*Tetrameres paradisea* **sp. nov.) from Stanley Cranes.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part I. 177-182. 8 figs. [10 refs.]

A description is given of *Tetrameres paradisea* n. sp. from Stanley cranes (*Tetrapteryx paradisea*). The parasites were lodged singly in the glands of Lieberkuhn and their position was indicated by a rounded swelling on the outer side of the proventriculus and by a small red spot in the orifice of the gland ; this spot was the posterior extremity of the parasite.—J. S. Steward.

Ross, I. Clunies, & Graham, N. P. (1932). **Parasitological Field Trials with Sheep. Results at " Gundowringa " New South Wales, and " Frodsley," Tasmania.**—*J. Sci. & Indust. Res. Australia.* **5.** 31-39. 2 tables.

In the first experiment, five lots of 50 lambs were pastured in the following ways :—(1) on improved pasture at the rate of 1 sheep per acre ; (2) on improved pasture at the rate of 2½ sheep per acre ; (3) as (2), but receiving treatment with carbon tetrachloride each month ; (4) on improved pasture subdivided into four paddocks grazed in rotation for a month at a time at the rate of 10 sheep per acre, and (5) as (4), but receiving monthly treatment with carbon tetrachloride. During the period of the trial no disease developed in any of the lots.

In the second experiment, various medicinal treatments were tried on three groups of 40 lambs, two groups of 50 lambs and one group of 97 lambs. Monthly doses of a 1 per cent. solution of copper sulphate, copper sulphate and sodium arsenite, carbon tetrachloride and extra supplies of concentrated food were tried. During the course of the experiment a few animals died in each lot [weather conditions were bad and it appears to be doubtful whether they died as a result of worm infestation ; the *post-mortem* findings in some of the lambs at the end of the experiment suggest that the general level of infestation was low]. It is concluded that monthly treatments with copper sulphate, copper sulphate and sodium arsenite, or carbon tetrachloride were effective in controlling the small trichostrongyles.—E. L. Taylor.

Galli-Valerio, B. (1932). Notes de parasitologie et de technique parasitologique. [**Notes on Parasitology and on Parasitological Technique**].—*Zlb. Bakt. I. (Orig.).* **125.** 129-142. 3 figs. [19 refs.] [Orig. in French].

In this paper the author gives an account of the many parasites which he has found in wild animals and birds, arranging the long list of finds according to the various hosts, his intention being thereby to give an idea of the frequency of the occurrence of various parasites and of the multiple parasitism encountered in some of the hosts. Notes are also given on the lesions observed and on the apparent pathogenicity of some of the infections.

It was found that various protozoan cysts, nematode and trematode eggs, nematode larvae and mites can be stained after fixation by placing in 4 per cent. formalin and allowing to dry on a slide.—E. L. Taylor.

Skrjabine, K. I. (1932). La Prophylaxie par le traitement des Helminthoses du mouton d'après la pratique de l'Union Soviétique. [**Prevention of the Helminthiasis of Sheep by Treatment, as Practised in the Soviet Union**].—*Bull. Off. internat. Epiz.* **6.** 155-172.

Fasciola, anoplacephalids, trichostrongylids and dictyocaulus are regarded as the most harmful parasites of sheep, *Dictyocaulus filaria* and *Haemonchus contortus* being mentioned in particular as causing enormous losses in the U.S.S.R.

Fascioliasis is largely controlled by the employment of regular doses of carbon tetrachloride and haemonchosis by regular treatment with a 1 per cent. solution of copper sulphate. A system of pasture rotation is being tried on an extensive scale for the control of the smaller trichostrongylids, 49,648 sheep in one district and 136,735 in another district being under observation, but the experiment, which was to run for two years, is not yet completed.

Trials with the various advocated treatments for dictyocaulus have shown the intratracheal injection of 10 c.c. of a solution of tincture of iodine and glycerol in water to be very effective if injected while the sheep is held on its back in an inclined position with the head at a higher level than the tail. A special pasture

rotation is also used whereby the pasture is subdivided into numerous small areas each of which is used for 10 days only, and not used by sheep again for 12 months. It is thought that special international action should be taken against this parasite. Eradication schemes included in the programme of the Central Institute of Helminthology on the second Five Year Plan make provision for the attempted eradication of cerebral coenurosis of sheep and echinococcosis of man and domestic animals.—E. L. TAYLOR.

BENBROOK, E. A. (1932). **Dracunculus medinensis (Linnaeus, 1758) appears in the United States as a Parasite of the Fox.**—*J. Amer. Vet. Med. Ass.* **81.** 821-824. 2 figs. [2 refs.]

The fox in question was home-raised and was the only fox parasitized. It had been kept under hygienic conditions, but it is noted that portions of vegetables, bananas and other fruit were sometimes included with the meat. Diagnosis was made by CHITWOOD of the Zoological Division of the Bureau of Animal Industry, U.S. Department of Agriculture. An account of the parasite as it occurs in man is given.—EDWARD F. PECK.

I. SCHWARTZ, B., & ALICATA, J. E. (1932). **Ascaris Larvae as a Cause of Liver and Lung Lesions in Swine.**—*J. Parasitol.* **19.** 17-24. 3 figs. [4 refs.]

II. TAYLOR, E. L. (1932). **Notes on Ascaris and Lungworms in Pigs.**—*Vet. J.* **88.** 438-441.

I. The examination of small cysts, a little less than 1 mm. in diameter, from beneath the capsule of the liver of a pig and from beneath the pleura, showed them to contain degenerated larvae which were identified with a reasonable amount of certainty as those of *Ascaris suum*. It is thought that many of the white spots and markings, on account of which the whole or part of the liver of pigs are condemned, may be due in this way to the encapsulation of ascaris larvae.

II. This paper points out the methods of control of lungworms in pigs suggested by the recent discoveries in the life history of the worms ; it also makes some mention of recent work on immunity and indicates how the information derived therefrom may be used, along with a knowledge of good hygienic methods, to keep worm infestations in check.—E. L. TAYLOR.

IMMUNITY.

I. BOQUET, A. (1932). Phénomène de Koch et réaction tuberculinique. [**Relation of Koch's Phenomenon to Tuberculin Reactions**].—*C. R. Soc. Biol. Paris.* **110.** 769-771. [1 ref.]

II. BOQUET, A. (1932). Sur la désensibilisation du Cobaye tuberculeux à la tuberculine. [**The Desensitization of the Tuberculous Guinea Pig to Tuberculin**].—*Ibid.* 902-904. [3 refs.]

III. CALMETTE, A. (1932). Au sujet des relations entre l'allergie tuberculinique et l'immunité dans la tuberculose. [**The Bearing of Allergy on Immunity in Tuberculosis**].—*Ann. Inst. Pasteur.* **49.** 279-283.

I. The author has attempted to confirm the suggestion postulated by Koch that the necrotic dermal reaction which followed a superinfection with tubercle bacilli was simply a tuberculin type of reaction.

In groups of infected guinea pigs a comparison was drawn between the responses to tuberculin and the bacillary bodies respectively ; the reactions were identical in every respect and were solely dependent upon the degree of hyper-

sensitiveness induced by the infection. It is suggested that the reaction to the bacillary bodies was induced by the tuberculin which they contained or which was liberated from them in the body tissues.

II. The experiments in the second paper were undertaken with the object of verifying the observations of BURNET [(1908). *C. R. Soc. Biol. Paris.* **65.** 307.] that tuberculous guinea pigs which had received several small doses of tuberculin subsequently resisted the subcutaneous inoculation of several lethal doses, and also to determine whether there was an accompanying desensitization of the dermis.

A group of infected guinea pigs received daily injections of 0·05 c.c. of concentrated tuberculin and were tested at varying intervals thereafter. It was found that the general reaction, i.e. the response to the lethal factor, disappeared first, then the thermal reaction and finally the skin sensitivity. It was also noted that an augmentation in the intensity of the treatment tended to reduce the difference in the general and local desensitization.

III. A general account of the relationship of allergy to infection in tuberculosis with special reference to vaccination with BCG. Calmette considers that allergy is not a manifestation of immunity, but that it is exclusively a sign of a bacillary infection. He supports this contention with various observations from the literature. He suggests that in certain countries (Great Britain and the U.S.A.), in which through improvements in hygienic conditions the incidence of human tuberculosis is slowly declining, the population may become increasingly susceptible to infection, and hence the necessity for a preventive vaccine, such as BCG, will become more urgent.—R. E. GLOVER.

I. VANDESTRATE, M. (1932). Sur la toxicité de la tuberculine pour les Cobayes infectés avec des Bacilles de virulence diverse, en particulier avec les souches R_1 (Trudeau), Tb 18 (Uhlenhuth) et BCG. [**The Toxicity of Tuberculin for Guinea Pigs infected with Strains of Different Virulence**]. —*C. R. Soc. Biol. Paris.* **111.** 617-619.

II. GUALDI, A. (1932). Le comportement des anticorps tuberculeux dans le choc tuberculinique. [**The Fate of the Antibodies during Tuberculin Shock**].—*Ibid.* 761-763. [2 refs.]

III. NINNI, C. (1932). Influence de la tuberculine sur la bacillémie tuberculeuse expérimentale. [**The Effect of Tuberculin on Circulating Tubercle Bacilli**].—*Ibid.* 768-770. [1 ref.]

I. The author has sought to differentiate tubercle bacilli of full virulence from strains which are of low virulence or are avirulent, by means of a tuberculin reaction.

As a result of his experiments, he has found that the response to tuberculin is in direct relationship to the virulence of the strain. For example, large doses of concentrated tuberculin (1·0 to 1·5 c.c.) inoculated subcutaneously failed to kill guinea pigs sensitized with BCG or with dead organisms, whereas a dose of 0·4 c.c. was fatal for animals sensitized with 10 mg. of attenuated strains (T.b. 18 for R_1) or with 0·001 mg. of a fully virulent bovine strain.

II. The presence of circulating tubercle bacilli was demonstrated by inoculating the blood of tuberculous guinea pigs into unaffected animals. The chances of success were dependent upon the extent of the infection : thus in guinea pigs with purely localized lesions, no positive results were obtained (six animals) ; in infection of moderate extent, three out of six were positive ; while in generalized cases five out of seven were positive. A preliminary intradermal injection of concentrated tuberculin two to six days before bleeding increased the numbers of circulating organisms.

III. The author has studied by the method of complement-fixation the behaviour of tuberculous antibodies in infected rabbits inoculated with varying doses of tuberculin. It was found that a dose of tuberculin, which was fatal within 24 hours, induced a marked reduction in the antibodies in a few hours ; while sublethal amounts, either in the form of a fairly large single dose or in the form of a number of small frequently repeated doses, produced a distinct fall in antibodies followed by a gradual rise to the original level.—R. E. Glover.

I. Komis, A. (1932). Le procédé recommandé pour la préparation de la tuberculine fermentée et son mode d'emploi. [**The Preparation and Application of a Fermented Tuberculin**].—*Presse méd.* Jan. 2nd. 3-4. [12 refs.]

II. Ninni, C. (1932). Peut-on rendre antigène *in vivo* la tuberculine brute ? [**Can Tuberculin acquire Antigenic Powers** *in vivo* ?]—*C. R. Soc. Biol. Paris.* **110.** 430-432. [2 refs.]

I. The medium proposed by Komis is prepared by dissolving peptone 10 g., glucose 40 g., potassium phosphate 3 g. [actual salt not specified] and magnesium phosphate 5 g. in a litre of distilled water, neutralizing and adding an equal amount of concentrated tuberculin diluted 1 : 20. The liquid, sown with a yeast culture, is allowed to ferment at 28°C. for two months and is then filtered through a candle after adjustment to pH 7·4.

The product is said to exert a very favourable influence on all forms of tuberculosis and, on account of its lack of toxicity (up to 1 g. can be inoculated subcutaneously), is superior to ordinary tuberculin as a therapeutic agent.

II. In a previous paper, Ninni has shown that concentrated tuberculin, which by itself is antigenically impotent *in vitro*, can acquire antigenic properties when mixed with certain bacterial proteins. In the present communication, he has attempted to prove that the same phenomenon can take place *in vivo*.

Rabbits were inoculated with serial doses of tuberculin alone and in conjunction with other substances. The sera were then tested for complement-fixing antibodies. It was found that no deviation occurred except with the sera from those animals which had received a mixture of tuberculin with living or dead emulsions of *Bact. coli*.—R. E. Glover.

Ninni, C. (1932). Reconstitution complète de la fonction antigène *in vivo* des lipoïdes du Bacille de Koch ; toxicité des mélanges. [**Complete Reconstitution of the** *in vivo* **Antigenic Function of the Lipoids of Tubercle Bacilli : Toxicity of the Mixtures**].—*C. R. Soc. Biol. Paris.* **110.** 35-38. 1 table. [5 refs.]

The author has shown that it is possible to augment the *in vivo* antigenic power of the lipoids of tubercle bacilli by mixing with them proteins of animal or bacterial origin. Rabbits were inoculated bi-weekly with varying mixtures and their blood serum tested for complement-fixing antibodies for a methylated extract of tubercle bacilli. The results indicated that the *in vivo* antigenic function of the methylated extract could be augmented by the addition of chemical substances such as phenol-alcohol, but more effectively by the addition of fresh horse or pig serum. Such augmentation was also shown to be possible by the addition of certain bacterial suspensions such as " defatted " tubercle bacilli or *Bact. coli* and even better results were obtained by the addition of a living suspension of *Bact. coli*. The mixtures were toxic to rabbits and two types of toxicity were apparent ; the first within several minutes of inoculation was shown by the appearance of respiratory disturbance and a general loss of tone with or without paralysis. The

rabbit either recovered quickly or died within two hours. The second type of toxic symptoms consisted of a profuse diarrhoea.—R. Lovell.

I. Nattan-Larrier, L., Noyer, B., & Bédier, E. (1932). Action de la chaleur sur le pouvoir anti-Trypanosome du sérum humain. [**The Action of Heat on the Anti-Trypanosome Property of Human Serum**].—*C. R. Soc. Biol. Paris.* **110.** 241-244. [3 refs.]

II. Nattan-Larrier, L., & Noyer, B. (1932). Action de l'ultrafiltration et de la chaleur sur le pouvoir trypanolytique des immun-sérums. [**The Effect of Ultrafiltration and Heat on the Trypanolytic Property of Immune Sera**].—*Ibid.* 1237-1239. [2 refs.]

I. By controlled experiments on mice it was found that the exposure of human serum for half-an-hour to a temperature of 59°C. destroyed its power of protection against *T. brucei*, but only slightly weakened its powers of curing an existing infection.

II. When immune sera from rabbits infected by *T. marocanum* were filtered through collodion membranes K.600 and K.250, it was found that the richness in trypanolysin of the filtrate was greater than that of the unfiltered sera. Exposure to a temperature of 59°C. for one hour did not destroy the trypanolytic property.
—U. F. Richardson.

—. (1932). **Prophylactic Inoculation against Bacterial Diseases.**—*Lancet.* **223.** 397-398. [Brit. Med. Ass. Centenary Meeting in London, Section of Bacteriology.]

The following are some of the points discussed at the meeting :—

(1) Artificial flock pre-immunization of mice in ectromelia, pasteurella, and *Bacterium aertrycke* infections.

(2) The roles of different types of antigens in the production of immunity.

(3) The method of inoculating the ewes, before conception and before lambing, with vaccine against the lamb dysentery bacillus, to produce a high concentration of antitoxin in the colostrum for the protection of the lambs against lamb dysentery.—Norman Hole.

I. Hambleton, A. (1932). **A Non-specific Complement Fixation Reaction due to Ion Antagonism.**—*Canad. J. Res.* **7.** 583-595. 4 fig., 2 tables. [18 refs.]

II. Hambleton, A. (1932). **On the Mechanism of Complement Fixation.**—*Ibid.* 596-605. 3 figs., 2 tables. [15 refs.]

I. A false positive result was produced in the complement-fixation test for tuberculosis by the use of balanced physiological saline instead of normal saline. Calcium chloride and magnesium chloride are the salts necessary for this false reaction. Sodium citrate, in appropriate concentration, or the removal of lipins from the antigen inhibits this non-specific reaction. [Much experimental detail is given and those interested in the subject are advised to study the original].

II. Antigens after use in the specific and non-specific reactions have very similar physical properties. The difference between the true and false reactions is only one of degree. Complement-fixation occurs with suitably modified antigens and it may be possible to use non-specific agents in the treatment of bacterial diseases instead of immune sera.—George Slavin.

Contini, A. (1932). Suppression du pouvoir anticomplémentaire de l'antigène tuberculeux méthylique par le sérum normal des différentes espèces animales.

[Suppression of the Anticomplementary Power of Methylated Tuberculosis Antigen by Normal Serum from Different Animal Species].—*C. R. Soc. Biol. Paris.* **111.** 682-683.

The anticomplementary action of the methylated antigen used in the complement-fixation test for tuberculosis is entirely neutralized by the addition of human or animal serum that has been inactivated at 56°C. The reaction can have no influence on tests where such inactivated sera are used as the amount required to counteract the anticomplementary reaction is much less than that used in the process of the test. Unheated monkey, horse, sheep and rabbit sera, however, do not always counteract the anticomplementary tendency.—Norman Hole.

Brill, J. (1932). Serophagoagglutination. **[Serophago-Agglutination].**—*Zlb. Bakt. I. (Orig.).* **126.** 540-550. 7 tables.

The addition of the specific bacteriophage to the suspensions of hypoagglutinable strains of bacteria produced an increased agglutinability against the specific serum. This phenomenon is called " serophago-agglutination " by the author. The tests were made with strain Fb S (smooth) type of a *Bact. coli* strain Fb obtained from Dr. Sertic, Zagreb, and the specific bacteriophage Fz from the same origin. The serophago-agglutination took place with living as well as with dead bacteria and depended on the quantity and lytic titre of the bacteriophage added. The author believes that the phenomenon probably depends on a surface effect. By adsorbtion of the specific phage the bacteria are rendered more sensitive against the specific agglutinins ; they are agglutinated by very small quantities of agglutinins which in the absence of the phage would not have any effect.—R. Wetzel (Hanover).

DISEASES, GENERAL.

de Kock, G. (1932). **The Study of Comparative Pathology.**—*S. Afric. Med. J.* **6.** 806-814. [50 refs.]

This is an appeal to the medical and veterinary workers of the Union of South Africa to meet for the discussion of comparative pathology. The author uses work which has been done in recent years at Onderstepoort to illustrate the interdependence of the various sections of pathology. No new work is introduced, but suggestions are made of possible relationships between certain animal and human conditions, the following examples being given :—the function of the spleen in ovine anaplasmosis and infection with *Nuttalia equi*, and its role in malaria ; the similarity between acute yellow atrophy of the liver in man and a similar disease in equines—Theiler (1918)—and the probability that " bread poisoning " in man is similar to poisoning in horses with species of *Senecio*. The paper contains many such suggestions covering a broad range of medical science and de Kock concludes by pointing out the resemblance between sweating sickness in man and a similar disease in calves and also between blackwater fever in man and enzootic icterus in sheep.—Edward F. Peck.

Burrow, H. (1933). *Post-mortem* **Technique in the Equine Subject.**—*Vet. Rec.* **13.** 213-220.

The author divides *post-mortem* examinations into two classes, specific and general, and gives broad indications as to when each is necessary. His technique for a general autopsy together with the procedure necessary when forensic action is likely to follow the death of an animal is described in detail.—A. A. Pryer.

Pacchioni, G. (1932). Osservazioni e considerazioni su di una sindrome toss-infettiva dei bovini. [**Observations and Considerations of a "Toxic-Infective" Syndrome in Bovines**].—*Nuova Vet.* **10.** 37-46 and 77-80. 8 figs., 2 tables.

The author gives an account of his investigations of a disease of cattle which is generally referred to as "leaf disease," and considered to be due to eating elm leaves. It has not been found possible to trace any connection between the condition and elm trees, but the pathology of it cannot be said to have been elucidated completely. Improper feeding is looked upon as a predisposing cause. In a minority of cases a toxin of alimentary origin, and in the majority of cases a toxin of bacterial origin are described as "complicating" or "determining" causes.

The important lesions encountered in carcasses of animals dead of the disease are slight icteric discolouration of the fat and haemorrhages in practically all the tissues.

The important lesions appear to occur in the liver, but it would seem that the alterations found are far from constant. Areas of fatty degeneration and necrosis also occur in the heart muscle.

Organisms recovered from cases were compared in their cultural and antigenic characters, and they appeared to belong to the coli or para-coli type.

—A. Leslie Sheather.

Rider, J. R. (1932). **Diverticula of the Small Intestine.**—*Vet. Rec.* **12.** 1202-1206. [9 refs.]

The author describes a chronic incurable debility occurring amongst colliery ponies, characterized by a varying degree of hypertrophy of the wall of the small intestine and, occasionally, associated with macroscopic diverticula.

The disease, which is encountered most commonly in imported Iceland ponies, although of low incidence and of small economic importance, is of interest when compared with intestinal diverticulitis in man. Whilst observations on pit ponies conform generally to the findings recorded in medical literature, certain differences occur. In the horse, the diverticula are found at the mesenteric border of the small intestine, whereas in man they are situated most commonly on the border of the large intestine remote from the mesentery. In human beings the patients are usually well nourished while, in horses, muscular wasting is constant. Diagnosis, *post-mortem* appearances, histology of the lesions and views as to aetiology are discussed, and records of six cases are appended.—A. A. Pryer.

Følger, A. F. (1932). **A Case of Hermaphroditism with Pregnancy in a Pig.**—*Transactions of the Fifth Scandinavian Pathological Congress.* Held in Lund, Sweden. July 3rd-6th. Suppl. 11. *Acta. path. et microbiol. Scand.* pp. 143-150. 2 figs. [3 refs.]

The author describes fully a case of hermaphroditism with pregnancy in a pig. Although hermaphroditism is not uncommon in pigs, the genital organs in such circumstances usually being more or less undeveloped, this case, showing evidence of functional activity by the presence of eight foetuses in the uterus, is a great rarity. In addition to the case record, the literature of bisexuality in domestic animals is reviewed briefly.—J. E.

Hollenbeck, J. B. (1932). **Swine Disease Control.**—*Vet. Med.* **27.** 420-425.

The author briefly discusses some of the more important diseases of swine. He has a high opinion of the serum-virus method of immunization against swine

fever (hog cholera) and considers that many of the so-called serum and virus " breaks " can be attributed to dietetic errors. The presence of swine erysipelas has been recognized for a number of years in the United States, but during recent years the disease has shown increased virulence.

Hollenbeck describes the symptoms and lesions of the disease. He refers also to worm parasites, necrotic enteritis and tuberculosis.—T. M. Doyle.

Dalling, T. (1932). **Some Diseases of Fur-Bearing Animals.**—*Vet. J.* **88.** 534-540. 2 photographs. [14 refs.]

This paper discusses canine distemper in the fitch and leptospiral jaundice and " distemper " in the fox.

The writer showed (1931) that the fitch is susceptible to canine distemper virus and can be immunized with attenuated virus from a ferret followed by a dose of active virus. He has since tried the method in naturally occurring cases of infection with satisfactory results. Anti-canine-distemper serum is recommended for in-contacts. In the case of the ferret, dog tissue vaccine is unsuitable for inducing immunity. Reference is made to Law's observations on canine distemper in the mink.

The writer has in one instance only demonstrated leptospira in the liver of a fox exhibiting icterus and the organism is difficult to demonstrate in the infected dog. Serum treatment of in-contact foxes gives satisfactory results and the writer believes that leptospiral infection is common in foxes in Great Britain. He describes the symptoms and discusses passive and active immunization.

Dalling (1932) proved that the fox is susceptible to canine distemper virus, but the existence of the disease on ranches in this country has not been proved. On the other hand, distemper-like epidemics are common both in this country and abroad. The observations of several workers since 1925 suggests that these outbreaks represent at least two conditions ; firstly an infection with organisms of the salmonella group and secondly an encephalitis epidemic due to a filtrable virus. The precise nature of so-called fox " distemper " calls for further research.

—G. B. Brook.

Shaw, J. J. M. (1932). **The Aetiology of Carcinoma.**—*Lancet.* **222.** 221-224 and 273-276. [48 refs.]

This communication, originally a post-graduate lecture delivered at Edinburgh, is a review of present knowledge and opinions on cancer.

The author regards carcinoma as " the process of growth in cells which have either failed congenitally to come under those influences which determine all function and form, or which, after being subject to such differentiating influences, have become independent of them owing apparently to a prolonged change in environment."

He points out that, in a consideration of aetiology, it is desirable to put aside the " malignant " aspect of the question and to postulate an essential naturalness in the process as a physiological response to the influences which act upon the cell. He deprecates the use of the terms " unnaturalness " and " lawlessness," which, he says, have drifted into the study of the cancer problem by strained analogies with the conduct of beings endowed with the power of thought.

After discussion on the potentialities of the cell, he discusses the specialization of function and corresponding differentiation of the structural form of cells and points out that differentiation is not manifest in the earliest stages of the developing embryo and may disappear temporarily during the process of repair. The question then arises, may this differentiation disappear finally if factors resembling those

responsible for the proliferations of repair are allowed to act over a prolonged period of time so that an inveterate habit is established ? Such a growth of cells induces changes in the blood and other tissues of the host and one of the chief difficulties in our present state of knowledge is to decide how far these manifestations are causal in nature and how far they are secondary and incidental.

The state of non-differentiation may be shown either by cells which have never reached maturity or structural form or by the descendants of cells which have been differentiated, but which have been altered by some means so that differentiation has been modified or has disappeared.

The recognition of this distinction is necessary for the consideration of such a tumour as renal blastoma.

There are three different methods of production of carcinoma :—(1) implantation ; (2) continuance and (3) conversion.

In the first group, there are the carcinomas of laboratory animals transplanted experimentally and the few cases of natural or accidental transplantation in human beings. In the second group there are the congenital tumours which appear to comply with the theory of cell nests. The conversion group is the most important and comprises the carcinomas associated with long continued irritation.

The author discusses the factors of heredity, parasites, chronic irritation, the mode of action of carcinogenic tars and oils with suggestion as to how similar substances may be derived from retained secretions, purulent exudate, mucins and old blood extravasation and may act as carcinogenic agents.—C. McG.

I. Herner, M. C., & Robinson, A. D. (1932). **A Study of Leg-bone Deformities in Growing Chicks. I. Deformities Produced by High Mineral Rations.** —*Poultry Sci.* **11.** 283-288. 5 tables. [10 refs.]

II. Durant, A. J., & McDougle, H. C. (1932). **Malnutrition or Leg Weakness in Baby Chicks.**—*Vet. Med.* **27.** 353. 2 figs.

I. The mineral nutrition of poultry has been investigated by means of a series of controlled diet experiments.

These experiments have been mostly confined to the elements calcium and phosphorus. Every effort was made to ensure that a perfect anti-rachitic ration including 2 per cent. cod liver oil was fed to the birds.

Chickens showed an abnormal leg bone development, characterized by thick hocks, bow legs, short shanks, twisted legs, slipped tendons as well as digestive disturbances. The authors find that the condition is brought about by a high mineral content in the ration.

A ration containing 4·73 per cent. ash was found to give as good growth as a ration with a higher ash content, and at the same time to produce fewer birds with these deformities.

II. The authors, dealing with leg weakness in very young chickens, find that the change to a well-balanced diet with a supply of green food corrects the condition within a week's time.—Norman Dobson.

Carlström, B., & Svanberg, O. (1932). **On the Aetiology and Pathogenesis of Spasmophilia and Rhachitis in Pig.**—*Skand. Vet.-tidskr.* **22.** 391-439. 6 figs., 13 tables. [38 refs.] [Orig. in English].

A description of a series of experiments in regard to the deficiency of alimentary lime in growing young pigs. The varying degrees of lime deficiency were in accordance with that which frequently occurs in practice. Work on the effect of the deficiency and addition of cod liver oil to the diet was also carried out. As a result of their experiments, the authors tried the effects of an increased calcium content

of the diet on pigs on farms. Their main conclusions were that rhachitis and spasmophilia were mainly the symptoms of a deficiency of nourishment of animals fed on maize, barley and waste products without due consideration to the mineral content of the food. The addition of calcium was essential for protection against rhachitis and hypocalcaemia, the action of cod liver oil alone not being sufficient to obtain advantageous development of the animals. Tables are given to show how the calcium oxide and phosphorus pentoxide content of the cereal foods are beneficially altered by the addition of 1 per cent. calcium carbonate.

—J. R. M. Innes.

van Dulm, J. (1932). Bestrijding der Osteomalacie (Osteofibrose) onder de Legerpaarden. [**The Control of Osteomalacia (Osteofibrosis) among Army Horses**].—*Ned.-Indisch. Blad. Diergeneesk.* **44.** 11-24. 1 table. [Summary in German : abst. from orig.]

A considerable portion of this paper is occupied by a review of current ideas and theories regarding the nature of the changes observed in cases of equine osteomalacia.

As a result of an article published by Marek in 1924, the author began to try to control the disease among army horses in the Dutch East Indies by the addition of dicalcium phosphate to the diet. The addition proved to be effective and since then no cases have occurred. It would, therefore, appear to be established, indirectly if not directly, that osteomalacia which the author insists is an osteofibrosis, and not osteoporosis, is of dietetic origin and not in the nature of a bacterial intoxication.—A. Leslie Sheather.

PUBLIC HEALTH.

Clarenburg, A., & Dornickx, C. G. J. (1932). Voedselvergiftiging bij den mensch in verband met duivenparatyphose. [**Food-Poisoning in Man associated with Pigeon Typhoid**].—*Tijdschr. Diergeneesk.* **59.** 545-554, 621-626 and 670-676. 9 tables, 2 charts. [13 refs]. [Summaries in English, French and German : abst. from orig.]

The authors describe an outbreak of food-poisoning in a military hospital at The Hague which was connected with the ingestion of a pie, one of the principal ingredients of which was pigeon eggs. From the pie, the blood, faeces and urine of the patients, from birds whence the eggs were obtained and from further eggs from these premises, there was obtained a bacillus of the paratyphoid group, which was identified as *Bact. aertrycke*.—A. Leslie Sheather.

Dábrigeon, J. C. (1932). Recherches sur les viandes "fièvreuses " et les viandes " surmenées." [**Research on Meat of Fevered and Exhausted Animals**].—*Thesis for Docteur vétérinaire, Alfort.* pp. xv + 103. 3 graphs. [30 refs.]

This thesis is of technical and scientific interest in meat inspection based on physiological, histological and physicochemical observations, particular attention being given to differentiation between transudation and exudation.

To those interested in these features, the perusal of the original thesis is recommended, but for the everyday work of the meat inspector, except when he may have to give evidence in a court of law, the subject is only of scientific interest.

The author is to be congratulated on the amount of work involved in the preparation of the thesis.—T. Dunlop Young.

I. Klimmeck. (1932). Das Milchgesetz mit Ausführungsbestimmungen und seine Bedeutung für den beamteten Tierärzt. [**The Milk Act and Orders, and their Importance for the Veterinary Officer**].—*Berl. tierärztl. Wschr.* **48.** 1-9.

II. —. (1932). Die milchgesetzlichen Bestimmungen. [**Milk Designations**]. —*Schlachthof- u. Lebensmit-überwach. Suppl. Deuts. tierärztl. Wschr.* **40.** 45-48.

III. —. (1932). Untersuchungsinstitute für Durchführung des Milchgesetzes. [**Research Institutes for carrying out the Milk Law**].—*Deuts. tieräztl. Wschr.* **40.** 139-140.

I. A new Milk Act came into force in Prussia on January 1st, 1932, and this article is an official explanation of its clauses for the benefit of Prussian Veterinary Officers.

II. This is a synopsis of the provisions of the new Milk Act, with definitions.

III. A list of 18 research institutes recognized for carrying out the tests required under the new milk law.—F. Bullock.

I. Dalrymple-Champneys, W. (1932). **Technical Methods and Devices in connection with the Pasteurisation of Milk.**—*J. Roy. Sanit. Inst.* **53.** 14-19. [1 ref.]

II. Seligman, R. (1932). **Pasteurisation Methods.**—*Ibid.* 19-30.

III. —. (1932). **Milk Pasteurisation in Glasgow.**—*Brit. Med. J.* Dec. 10th. 1076.

IV. Orr, T. (1932). **Is Pasteurisation the Solution of the Milk Problem?**—*Publ. Health.* **45.** 326-335. [33 refs.]

I. In this paper the objects of pasteurization are defined, followed by a consideration of the chief factors which influence the efficiency of the process. Details are given of the procedure which health inspectors should follow when inspecting a plant.

II. This paper is devoted to the engineering side of pasteurization and contains brief descriptions of the chief methods at present in use. Attention is directed to those points which call for close examination when judging the efficiency of a plant.

III. This annotation concerns an address delivered by the medical officer of health for Glasgow, in which he gives his reasons for favouring " the pasteurisation of the general milk supply other than that derived from tubercle-free herds." It is stated that the history of milk-borne epidemics in Glasgow showed that all had occurred in connection with milk not subjected to pasteurization before delivery. The process also appeared to be a great safeguard against bovine tuberculosis.

IV. At the Annual Provincial Meeting of the Society of Medical Officers of Health, held at Leicester, the author gave figures relative to the producers of T.T. milk in England and Wales and stated that " even the most sanguine advocate of graded milk could not call that good progress in producing a safe new milk supply." Approximately only 0·5 per cent. of the dairy stock is guaranteed tuberculosis-free. He stated that, as it is a problem which cannot be solved for many years to come, the consumer must be protected by pasteurization. " Whilst it does not confer absolute security, yet it provides a large measure of protection which cannot be secured in any other way." Facts do not support the contention that the nutritive value of milk is adversely affected to any material extent.

The writer maintains that its extended adoption would not militate against the development of clean methods of production and handling and the building up of healthy herds of cattle. In reality, when pasteurization has been practised,

it has given an impetus to clean milk production. Regarding the application of pasteurization, he thinks it both impracticable and undesirable to enforce it all over the country, but he considers that power should be given to large and progressive authorities.

In the discussion which followed, the majority of speakers supported pasteurization stating that it should be adopted in conjunction with measures ensuring a clean milk supply.—Gwilym O. Davies.

Tobey, J. A. (1932). **Recent Court Decisions on Milk Control.**—*Publ. Health Rep. Washington.* **47.** 2250-2256. [6 refs.]

This is a review of 20 recent American court cases on various aspects of milk control : pasteurization, tuberculin-testing, licenses and permits, adulteration, etc., and the application, interpretation and interrelation of municipal regulations and state and federal laws on the subject. The decisions quoted confirm the law that tuberculin-testing of dairy cattle and pasteurization requirements are properly placed under the police power of the State, and that licences may be granted or revoked under conditions imposed by health authorities so long as the action taken is conducted in a strictly legal manner and without oppressiveness. If, however, regulations or procedures are defective or contrary to state or federal legislation, they will not be upheld.—F. Bullock.

THERAPEUTICS.

Cohen, L. (1932). **Some Recent Dipping Experiments for Cattle Tick : A Critical Review.**—*Austral. Vet. J.* **8.** 142-149. [8 refs.]

The writer discusses the results of his own researches and those of other workers. He considers that the most resistant stage of the parasitic life of the tick is during the second moult rather than as adults.

Two dippings at an interval of three or seven days, in dips containing 8 lb. of arsenic per 400 gallons, were completely effective in destroying all ticks.

The results of experiments to show the effect of adjuvants favour the addition of potash soap, Stockholm tar and resin in the proportion of 3 lb., $\frac{1}{2}$ gallon and 4 lb. respectively, combined with either 7 or 8 lb. of arsenic. The remarkable variations in the numbers of ticks that reached maturity in the untreated control animals render difficult satisfactory comparative experiments, as also do variations in meteorological conditions immediately subsequent to treatment.—J. S. Steward.

Aston, B. C., & Lyons, J. (1932). **Stock Licks and their Composition. Some Recent Developments.**—*New Zealand J. Agric.* **44.** 305-308.

The finding of Theiler and others that, when efficiency and dose are considered, precipitated dicalcic phosphate is more economical than bone meal, is even more applicable in New Zealand than in South Africa. The phosphate content of bone char after being discarded by sugar refineries amounts to 72 to 82 per cent. Sheep require a lot of sulphur and they are often grazed on mountainous areas where this element is deficient. Merino sheep, given 5 g. sulphur from once to six times weekly, showed a striking benefit in weight and wool yield. Poisonous symptoms developed when sulphur was given at the rate of 15 g. thrice weekly. 3 oz. of potassium iodide per ton of lick is all that is warranted in a normal district.—Henry Dryerre.

Gildow, E. M., Hansen, H. C., & Cherrington, V. A. (1933). **Treatment**

for Mastitis with Ultraviolet Light, Formalin, Colloidal Carbon and Autogenous Bacterins.—*J. Amer. Vet. Med. Ass.* **82.** 55-64. 2 figs., 1 table. [9 refs.]

Treatment of early cases of streptococcal and staphylococcal mastitis was conducted with the above substances to determine their effects on the bacterial and leucocytic counts of the middle milk. Most of the ten cases were treated with ultra-violet light on the udder and, although this was found to control the clinical symptoms, it had no effect on the bacterial or leucocytic counts. Referring to formol, the authors state that they found that 1 oz. given daily *per os* [? in small doses—diluted] for nine days was not excreted in the milk. It was concluded from these experiments that no consistent reduction in the number of bacteria or leucocytes in the middle milk could be effected by the methods used. Various methods were tried successively on the same experimental subject.

—Edward F. Peck.

I. Knaysi, G. (1932). **The Toxicity of Iodine for the Cells of Mycobacterium tuberculosis.**—*J. Infect. Dis.* **50.** 255-260. 4 tables. [4 refs.]

II. Knaysi, G. (1932). **The Use of Iodine and of Certain Iodine Compounds in Experimental Tuberculosis.**—*Ibid.* 261-268. 2 tables. [4 refs.]

I. The author found that high dilutions of iodine (dissolved in aqueous potassium iodide) were toxic to suspensions of tubercle bacilli; after 30 minutes exposure to $1 : 10^4$ the cells failed to grow on agar, and failed to infect guinea pigs after 15 minutes exposure to $1 : 5 \times 10^3$. The conflicting earlier results of de Witt and Sherman are explained on the grounds that these investigators used cell clumps and dried cells (protective action of surface lipoids).

II. Knaysi tested the therapeutic value of intravenous injections of iodine into rabbits experimentally infected with a bovine strain of *Mycobact. tuberculosis*. The dosage was 2 mg. per kg. twice a week for two months. Results were negative, probably because of rapid conversion of iodine to iodide by the alkali reserve of the blood. Injections of amiodoxyl (painful) and repeated inhalations of ethyl iodide were also negative.—H. H. Green.

I. Cruess, W. V., & Irish, J. H. (1932). **Further Observations on the Relation of pH Value to Toxicity of Preservatives to Microorganisms.**—*J. Bact.* **23.** 163-166. 2 tables. [1 ref.]

II. Watkins, J. H., & Winslow, C. E. A. (1932). **Factors Determining the Rate of Mortality of Bacteria Exposed to Alkalinity and Heat.**—*Ibid.* **24.** 243-265. 6 figs., 4 tables. [72 refs.]

I. In a previous paper it was shown that a higher concentration of sodium benzoate was required to prevent growth of yeasts, molds and bacteria at pH values near neutrality than at distinctly acid ranges. This paper gives the results of experiments conducted to determine the effect of pH value on the preservative action of several weak acids and of two other preservatives, sodium chloride and formaldehyde.

It was found that the concentrations of weak acids, benzoic, salicylic, sulphurous and acetic acids required to prevent the growth of micro-organisms from fruit juices were greater at neutrality than in an acid pH. Their retarding action on fermentation was likewise affected. The preservative action and retarding effect of sodium chloride and formaldehyde on fermentation were little affected by pH value.

II. When vegetative cells (*Bact. coli*), are exposed to the toxic action of sodium hydroxide, the mortality rate is not influenced by time, but reduction

proceeds at logarithmic rate. The rate of this mortality varies with at least four factors, as follows :—(a) the age of the culture used for inoculation ; (b) the concentration of the inoculum ; (c) the intensity of the toxic agent and (d) the temperature.

The influence of the concentration of cells used in the inoculum is stated to be due to the production of protective substances by the cells.—A. J. Wilsdon.

I. von Oettingen, W. F., Calhoun, O. V., Badertscher, V. A., & Pickett, R. E. (1932). **Comparative Studies on Mercurochrome and Other Antiseptics.**—*J. Amer. Med. Ass.* **99.** 127-134. 2 tables, 1 chart. [42 refs.]

II. —. (1932). **Efficiency of Mercurochrome and other Antiseptics.**—*Brit. Med. J.* Aug. 13th. 303. [1 ref.]

Both papers deal with the investigation organized by the Council of Pharmacy of the American Medical Association into the efficacy of mercurochrome, the relative merits of which have been a matter of controversy for several years.

The main conclusions are that this compound, when once fixed on tissues, develops no bacteriostatic action and that, although it penetrates and stains necrotic tissue, it does not penetrate living tissues. In the case of the skin it is fixed in the superficial epithelium. It cannot be relied upon to destroy bacteria living on the tissue of a wound and it thus shows the limitations of most antiseptics, which merely disinfect surfaces.—H. H. Green.

Banerjee, G. S. (1933). **Piroblue in the Treatment of Canine Piroplasmosis.**—*Ind. Vet. J.* **9.** 198-200.

The author records successful results in the treatment of canine piroplasmosis with piroblue in doses of 2 to 3 c.c. intravenously. Usually a lowering of temperature occurred after the initial injection and in five to seven days the temperature was normal. Four typical cases are described.—Edward F. Peck.

I. Napier, L. E., & Das Gupta, B. M. (1932). **Atebrin : a Synthetic Drug for the Treatment of Malaria.**—*Ind. Med. Gaz.* **67.** 181-186. 4 tables, 2 charts. [2 refs.]

II. Napier, L. E., Butcher, Dorothy, & Das Gupta, C. R. (1932). **Field Experiments with Atebrin and Plasmochin.**—*Ibid.* 186-191. 5 tables. [4 refs.]

III. Kikuth, W., Sioli, & Peter, F. M. (1932). Zur Weiterentwicklung synthetisch dargestellter Malariamittel. I. Ueber die chemotherapeutische Wirkung des Atebrin. II. Ueber die Wirkung des Atebrin bei der Impfmalaria der Paralytiker. III. Ueber die Wirkung des Atebrin gegen natürliche Malarianinfektion. [**Development of Synthetic Specifics for Malaria. I. Chemotherapy of Atebrin. II. Effect of Atebrin on Induced Malaria of Paralytics. III. Effect of Atebrin against Natural Malaria**].—*Deuts. Med. Wschr.* **58.** 530-535. 1 fig., 5 charts. [10 refs.] [The three parts of this article are separate papers by Kikuth, Sioli, & Peter, respectively.]

These papers deal mainly with the synthetic drug atebrin, the action of which is claimed by the makers (Bayer-Meister Lucius) to be complementary to plasmochin in the sense that the former acts on the asexual forms and the latter on the sexual forms of malaria parasites.

I. Records preliminary trials on 8 human cases (3 *Plasmodium vivax*, 5 *P. falciparum*, 2 *P. malariae*) and concludes that atebrin in 0·1 g. doses thrice daily for four days (a) is neither toxic nor unpleasant to take ; (b) controls the

fever ; (c) causes disappearance of asexual forms from peripheral blood, but (d) does not destroy sexual forms of *P. falciparum*.

II. Minimal doses of plasmochin (0·01 g. three times a week) were given to 46 persons for three months. Not only was there no protection but the incidence of malaria was actually higher amongst the " protected " population.

In a series of 35 cases of malignant tertian and 13 cases of benign tertian malaria, in which 1·2 g. atebrin was given in a four-day course followed by 0·06 g. plasmochin in a three-day course, there were only 7 recurrences (5 and 2 respectively) of which some were probably reinfections. In 41 cases the peripheral blood was examined immediately after treatment and in only one case were parasites seen (a few *P. falciparum* crescents only).

III. All three authors agree on the value of atebrin as a specific for the schizonts. Kikuth advocates plasmochin for the gametes and atebrin for the schizonts of all species of plasmodium. Sioli found oral administration of atebrin, 0·1 g. thrice daily for several days, effective in preventing relapses in the tertian malaria induced in paralytic patients. Peter found atebrin, (a) effective against all stages of *P. vivax* in tertian malaria, and (b) effective against the schizonts of *P. falciparum* in tropical malaria but not against the gametes ; dosage was 1 to 2 g. divided over 5 to 10 successive days.—H. H. Green.

Walter, R. (1932). Lichtmangelerkrankungen. Wirkung und Bedeutung von Glünbirnen, die ähnlich dem Sonnenlicht, auch ultraviolette Strahlen spenden, in Verbindung mit einem Schirm, der die Intensität der Strahlung gleichmässig verteilt. [**Light Deficiency Diseases, Effects of Lamps emitting Ultra-Violet Light, combined with a Screen which distributes the Light**].—*Arch. wiss. prakt. Tierhlk.* **65.** 353-359. 2 figs., 3 tables. [1 ref.]

The author groups rickets, " bone softening " [osteomalacia ?] and " licking disease " in stalled cattle as " light deficiency diseases." He carried out experiments to ascertain whether ultra-violet irradiation during the period of milking and feeding had a beneficial effect, using a 500 Watt Osram Vitalux lamp with a screen which distributed the light uniformly over the stall. The daily irradiation amounted to about one and a half hours in the morning and two hours in the evening and the treatment extended from 5 to 18 days.

The first experiment included four young oxen, four cows, and a heifer showing " hide binding " and other symptoms. A hide-bound condition was regarded as an early symptom of light deficiency disease. Improvement was rapid under irradiation. A young pig suffering from rickets was included in the experiment and recovered in a fortnight. The remaining four experiments included ten cows suffering from various degrees of hide-binding, bone softening and licking disease. [Precise technical diagnosis not given]. Records of clinical appearance are given for each individual case. Improvement in condition began at once, signs of disease disappeared in a fortnight and milk yield increased (5 to 15 per cent.). In some cases suppressed sexual function was restored.

[Compare Theiler.—this *Bulletin*. **3.** 39.—on bovine rickets and osteomalacia, and contrast the findings of Gullickson, T. W., & Eckles, C. H. (1927). " The Relation of Sunlight to the Growth and Development of Calves."—*J. Dairy Sci.* **10.** 87.—in which a calf was brought to maturity on an ordinary ration in absence of light and in due course herself delivered a healthy calf. Consider also the relative good health of coal-pit ponies].—H. H. Green.

POISONS AND POISONING.

COUCH, J. F. (1932). **Poisoning of Livestock by Plants that produce Hydrocyanic Acid.**—*U.S. Dept. Agric. Leaflet.* No. 88. pp. 4.

The more dangerous cyanogenetic plants found in the United States include *Prunus virginiana, P. serotina* ; *Sorghum vulgare, S. halepense* ; *Linum usitatissimum, Holcus lanatus, H. sorghum,* and *H. sudanese* ; *Triglochin maritima, T. palustris* and *Photinia salicifolia.*

The poisonous dose of hydrocyanic acid for a cow is placed at somewhat over 6 grains, that for the sheep being about $1\frac{2}{3}$ grains, and a plant containing as little as 0·02 per cent. of potential acid may prove dangerous.

Alkalinity of the paunch is held to check the liberation of the acid, as also is glucose, the latter substance probably acting by fixation of the hydrocyanic acid as cyanhydrine. The display of symptoms is almost always followed by death.

[Experience in Great Britain tends to show that comparatively large quantities of the acid may be slowly set free and eliminated in ordinary feeding, and that the greatest danger follows preparation of the ration as a warm mash in which case the greater part of the available acid is taken in one dose].—G. D. LANDER.

I. STEYN, D. G. (1932). **Known Poisonous Plants in the Union of South Africa.** —*J. S. Afric. Vet. Med. Ass.* **3.** 178-189.

II. METTAM, R. W. M. (1933). **Some Poisonous Plants of Kenya.**—*Vet. J.* **89.** 37-47. [12 refs.]

I. A convenient check list of 117 South African poisonous plants arranged in tabular form—six columns showing botanical name, common names, family, geographical distribution, active principles if known, and main symptoms of poisoning.

II. Records tests for toxicity on six plants collected in Kenya over 1927 to 1929 and suspected of causing mortality in livestock. Four of these represent species apparently new to toxicological literature. Little is known of the toxic principles. Sheep were used as experimental animals and symptomatology and *post-mortem* findings are recorded.

Cucumis ficifolius (a wild gourd) caused rapid death from acute gastro-enteritis when administered in quantities up to 2 lb. With *Ranunculus pinnatus* (a wild buttercup) the fatal dose of the fresh flowering plant was about 4 lb. *Adenopus abyssinicus* (a wild marrow) was exceedingly toxic, death occurring within 36 hours after injecting 15 c.c. of an aqueous infusion equivalent to 6·6 g. of ripe gourd. *Latana salvifolia* (a woody shrub) was shown to be poisonous but the results were erratic—2·7 lb. being fatal to one sheep but 6·2 lb. producing no symptoms on another occasion.

Two tests on *Diplophium abyssinicum* (a wild fennel) were limited by insufficiency of material but the respiratory symptoms following injection of aqueous infusions from 5 g. plant in one case, and 15 g. in the other were alarming.

The incidence of poisoning by *Stephanorossia palustris* (" water celery " or " water parsnip ") under natural conditions in Kenya is discussed. The roots appear to be always deadly but the poisonous character of the leaves is much reduced as the plants grow to maturity.—H. H. GREEN.

CUTLER, Jessie T. (1932). **The Influence of Diet on Carbon Tetrachloride Intoxication in Dogs.**—*J. Pharmacol.* **45.** 209-226. 2 figs., 6 tables. [24 refs.]

Variation in diet does not appear to influence the extent of necrosis of liver

cells, but on the other hand profoundly modifies the severity of the symptoms secondary to liver damage. Calcium antagonizes guanidine, and carbohydrate protects against hypoglycaemia. A diet rich in calcium and carbohydrate therefore confers the highest degree of resistance.—G. D. LANDER.

BEIJERS, J. A. (1932). Kopervergiftiging bij schapen. [**Copper Poisoning in Sheep**].—*Tijdschr. Diergeneesk.* **59.** 1317-1324. [Summaries in English, French and German : abst. from orig.]

The author describes some cases of chronic copper poisoning in sheep following the use of Bordeaux mixture spray in an orchard. The symptoms observed were anaemia, icterus, haematuria and haemoglobinuria and bloody faeces, and the *post-mortem* examination revealed fatty degeneration of the liver and parenchymatous degeneration of the kidneys. Analysis showed 1 g. of copper sulphate in the liver and 130 mg. per kg. in the stomach contents.—G. D. LANDER.

PHYSIOLOGY.

KAUFMAN, Laura. (1932). Quelques expériences sur les hormones déterminant la sécrétion lactée du jabot des Pigeons. [**Some Observations on the Hormones determining the Milk Secretion of the Crop of the Pigeon**].—*C. R. Soc. Biol. Paris.* **111.** 881-883. [3 refs.]

A series of experiments on 14 castrated adult male pigeons. The author does not agree with the work of RIDDLE and DYKSHORN, who concluded that the testes are not necessary for the secretion in the crop of the male. It is found that during mating the testes secrete a hormone which stimulates the anterior pituitary to produce another hormone which in turn stimulates the production of " milk " by the crop. Secretion by the crop does not appear in normal pigeons which are not allowed to breed.—HENRY DRYERRE.

MAJERT, W. (1932). Die Wirkung des Hypophysenvorderlappenhormons " Prolan " auf den weiblichen Geschlechtsapparat unserer grossen Haustiere, mit spezieller Berücksichtigung der Eignung zur Bekämpfung der Sterilität. [**The Action of the Anterior Pituitary Hormone " prolan " on the Female Genital System of our Large Domestic Animals, with Special Reference to its Suitability in the Combating of Sterility**].—*Inaug. Diss. Hanover.* pp. 52. 3 tables. [31 refs.]

HUPKA, E., & MAJERT, W. (1932). Ueber die Einwirkung des Prolan auf Eierstock und Euter bei Haustieren und über seine Eignung zur Bekämpfung der Sterilität dieser Tiere. [**On the Action of "prolan" on Ovary and Udder in Domestic Animals and on its Suitability for the Combating of Sterility in these Animals**].—*Deuts. tierärztl. Wschr.* **40.** 614-616. [15 refs.]

These two publications cover more or less the same ground, the former dissertation being worked out in Professor Hupka's ambulatory clinic, at the Hanover Veterinary College.

The anterior pituitary hormone " prolan " contains two active principles, a follicle-ripening hormone and a luteinizing hormone ; these have so far not been isolated separately. Much work with the hormone has been performed on small laboratory animals, principally in connection with the Ascheim-Zondek reaction. The authors applied it to 38 cattle, 4 mares, 11 sheep and 5 sows. Ninety per cent. of the cattle showing abnormal ovarian function responded markedly by exhibiting oestrum after one, two or three injections of " prolan " ; three of the

four mares also responded, but success was not so great with the ewes and sows. Another action of " prolan " was a stimulation of milk secretion in lactating cows and sows.

The relevant literature is reviewed in the dissertation and the detailed results are also given. At the beginning of the experiment " prolan " isolated from the urine of pregnant women was employed, but it is not clear whether that or a preparation from the pituitary body was used in addition. The matter of biological standardization has been based on Zondek's rat unit.—J. E.

NAUDIN, L. (1932). L'action du lobe postérieur d'hypophyse sur l'utérus sain et malade de la chienne. **[The Action of the Posterior Lobe of the Pituitary upon the Normal and the Morbid Uterus of the Dog].**—*Rev. gén. Méd. vét.* **41.** 745-746.

The author does not agree with GRAF'S observation that chronic inflammation of the uterus in the dog prevents the action of pituitary extract on that organ. It is shown that comparatively small injections of pituitary extract have been sufficient to expel the pus from the uterus of a dog affected with metritis. Aided by general antiseptic treatment and the oral administration of ergotamine tartrate, a cure, or at least amelioration both obvious and lasting, has resulted. It would be unfortunate if GRAF'S observations were to discourage practitioners from using this medical treatment which gives such good results.—HENRY DRYERRE.

QUINLAN, J., & MARAIS, I. P. (1932). **Gland Grafting in Merino Sheep. Preliminary Observations on its Influence : (c) on Castrated Sheep.**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 819-830. 7 figs., 2 tables, 1 chart. [14 refs.]

Following a brief history on the subject of gland grafting in sheep, the authors describe in detail the technique of the operation performed on wethers, in which sections of testicles were grafted, as well as that on two young virile rams which acted as donors.

After suitable preparation the flank was the site selected and, following the skin incision, blunt dissection was adopted, two pockets being made, one between the tensor fascia lata and the obliquus externus and the other between the transversus abdominis and the obliquus internus. The authors state that at the end of 12 months the testicular tissue was completely absorbed. The growth of wool did not appear to be noticeably stimulated ; the average difference in fleece-weight after $7\frac{1}{2}$ months growth being 0·26 lb. in favour of the grafted group. The operation, which was performed under deep general anasthesia induced by the intravenous injection of chloral hydrate, did not influence the temperament of the wethers, but they appeared to " put on mutton " more rapidly than the control animals.—G. W. DUNKIN.

EASTLAND, C. J., EVERS, N., & THOMPSON, J. H. (1932). **Some Extracts of Parathyroid Glands containing an Anti-growth Factor. I.**—*Biochem. J.* **26.** 2123-2128. 4 figs. [6 refs.]

The parathyroid gland has previously been shown to possess a serum-calcium raising factor. As a result of injecting a parathyroid preparation into animals, one of the authors was led to suspect the presence of an anti-growth factor. It was thought that this anti-growth activity might be due to the serum-calcium raising factor itself or to the presence of a specific anti-growth factor as an impurity in the extract. Extracts were therefore made by various methods and tested on rats. The experimental results are summarized as follows :—the extracts have been found

to contain a factor which retards the normal growth of rats; extraction with acid alcohol gives active extracts; alkaline extraction gives little or no activity; removal of the fat gives better extraction, but the fat may contain some of the activity; salting-out increases the potency of active extracts, the salted-out material having no activity; treatment with activated charcoal does not affect the potency; treatment with hydrogen peroxide may partially or completely destroy the activity. —R. G. Linton.

Anderson, A. K., & Triebold, H. O. (1932). **A Biochemical Study of Irradiated Milk.**—*J. Dairy Sci.* **15.** 469-474. 2 tables, 2 charts. [2 refs.]

It is concluded that the irradiation of milk for a normal period causes no significant changes in its constituents, upon its digestibility, or on its physico-chemical properties.—Henry Dryerre.

Demmel, M. (1932). Der normale und pathologische Serumeiweissgehalt beim Rinde. [**The Normal and Pathological Serum-Albumen Content of Cattle**].—*Münch. tierärztl. Wschr.* **83.** 457-460. 1 fig., 1 table. [14 refs.]

The technique for albumen estimation used was the Reiss refractometer method. The normal content was estimated upon 67 healthy slaughterhouse animals of varying ages. The content ranged between 6·3 and 8·9 per cent., with an average of 7·6 per cent. 129 diseased slaughterhouse cattle were examined similarly; these were mainly tuberculous cases which showed a general increase of albumen to about 8·5 per cent. Twenty cases of genital disease showed a rise to about 8·0 per cent. The remaining cases were too varied in nature to give valuable information.

Clinical cases of sexual disorders were examined. Five cases of nymphomania showed a marked increase of serum-albumen, the highest content found being 9·3 per cent.—E. J. Pullinger.

I. Taylor, N. B., & Weld, C. B. (1932). **The Mobilization and Excretion of Calcium following Overdosage with Irradiated Ergosterol.**—*Brit. J. Exp. Path.* **13.** 109-127. 2 figs., 11 tables. [34 refs.]

II. Taylor, N. B., & Weld, C. B. (1932). **The Toxic Effect of Excessive Doses of Irradiated Ergosterol upon Young Animals.**—*Ibid.* 403-411. 1 fig., 5 tables. [3 refs.]

I. With dogs in negative calcium balance, large doses of irradiated ergosterol caused hypercalcaemia and further increased total calcium excretion. Increase in urinary calcium followed attainment of a certain level of hypercalcaemia. The power of the intestine to absorb calcium was not increased. The hypercalcaemia was therefore due to withdrawal of calcium from the skeleton [compare Harris, this *Bulletin*. **3.** 203].

Cats poisoned with lead and then given large doses of irradiated ergosterol showed a striking increase in the quantity of the metal excreted in the urine.

II. The individual resistance of young dogs to the toxic effects of irradiated ergosterol varied considerably. In some cases a daily dose of less than 10 times the maximal dose for the human infant (i.e. 0·12 c.c. of 250 D per kg. body weight) proved toxic; on the other hand one dog was unaffected by 25 times the maximal therapeutic dose.—H. H. Green.

Netter, R. (1933). Recherche du carotène dans le sérum sanguin du Cheval. [**A Study of the Carotene in the Blood Serum of the Horse**].—*C. R. Soc. Biol. Paris.* **112.** 165-167.

The serum of horse blood yields no colour to ether or other fat solvents, even after saponification with potassium hydroxide. A dried alcoholic extract of the serum does not give any pink colour when dissolved in carbon bisulphide, or give any red colour when acted upon by antimony trichloride, thus showing absence of carotene. It is concluded that the yellow colour of the serum is derived exclusively from an alcohol soluble pigment similar to bilirubin.—HENRY DRYERRE.

PIRIE, N. W. (1932). **Studies in the Sulphur Metabolism of the Dog. XI. The Metabolism of Methionine and Related Sulphides.**—*Biochem. J.* **26.** 2041-2045. 1 fig. [17 refs.]

The present work is an extension of that done by MUELLER (1924) who showed that, in man, methionine was readily oxidized to sulphate ; dogs were used and methionine was compared with cystine on the one hand and with some other sulphides, S-benzylcysteine, S-ethylcysteine and S-methylcysteine, on the other. Methionine was found to be oxidized by the dog to the same extent as cystine. S-ethylcysteine and S-benzylcysteine were not appreciably oxidized. S-methylcysteine was found to be oxidized to some extent, but is too toxic to allow an accurate estimate of its oxidation to be made.—R. G. LINTON.

GABRIEL, M. T. (1932). **Cortical Cells of Merino, Romney and Lincoln Wools.**—*New Zealand J. Sci. & Tech.* **14.** 123-126. 4 figs., 1 table, 1 graph. [4 refs.]

The author describes the cortical cells of Lincoln, Merino and Romney wool fibres. Very little difference in size exists, but Lincoln cells appear to have a bifid edge. Cells are obtained by breaking down the wool fibre with the " pink rot " organism, the aerobic spore-bearer described by WATERS in 1932 [see this *Bulletin.* **2.** 644].—C. S. M. HOPKIRK.

STEDMAN, E., STEDMAN, Ellen, & EASSON, L. H. (1932). **Choline-Esterase. An Enzyme Present in the Blood-Serum of the Horse.**—*Biochem. J.* **26.** 2056-2066. 3 tables. [14 refs.]

The authors have demonstrated the presence of an enzyme in the blood-serum of the horse, for which they suggest the name choline-esterase, which hydrolyses both acetyl- and butyryl-choline. It is different from the liver-esterases from the pig and cat, since the latter are without action on esters of choline. Methods for the purification of choline-esterase are described.—R. G. LINTON.

TECHNIQUE.

I. STENIUS, R. (1932). Något om skjutmåtten vid intracutana tuberkulinundersökningar. [**On Calipers for Use in the Intradermal Tuberculin Tests**].—*Skand. Vet.-tidskr.* **22.** 540-544. 2 figs. [Summary in English : abst. from orig.]

II. PLUM, N. (1932). Om Hudmaalinger. [**On Skin Measurements**].—*Ibid.* 619-627. 2 figs., 1 chart. [Summary in English : abst. from orig.]

III. STENIUS, R. (1933). Randanteckningar rörande tekniska detaljer vid intrakutana tuberkulinundersökningar. [**Notes on Technical Details of the Intradermal Tuberculin Test**].—*Ibid.* **23.** 102-109. [Summary in English : abst. from orig.]

I. Stenius points out the bad points of the slide-rule calipers commonly used for measuring the thickness of the skin in intradermal tuberculin tests. They

are difficult to manipulate accurately with one hand and the scale's minimum unit is the millimetre, which is considered too large. He has had an improved instrument made which shows readings on a circular dial with a moving pointer to units of millimetres and tenths of millimetres. The instrument is made by a Helsingfors firm, whose name and address are given.

II. Plum, commenting on I, states that he has studied the technique of skin measurement and has designed an instrument with a circular dial reading to one-tenth of a millimetre and incorporating a second manometer dial showing the pressure applied by the jaws of the instrument on the skin. With such an instrument ideal results can be obtained by standardizing the pressure but, as the cost of the best type of this instrument is too high for its general use, a cheaper but more cumbersome model working on the same principle was adopted. Tests by different persons with this instrument showed that its error averages only 0·2 mm. The author enlarges on this aspect of the matter and discusses it on a mathematical basis.

[With such accurate instruments the interpretation of results with the intradermal tuberculin tests should be materially improved. The various instruments discussed by both authors are illustrated in the original papers].

III. Stenius further discusses the variations in the technique of Scandinavian workers and makes the following suggestions as to detail :—(1) the site of choice is the skin immediately behind the left shoulder blade and high up ; (2) an area of 5×3 cm. (flat) to be clipped but not shaved ; the caliper arms to be applied at an angle of about 40° to the skin surface firmly, but not hard ; (3) the site to be cleaned before injection by lysol and water followed by spirit and also to be cleaned with spirit after injection ; (4) the needle to be of very small size and to be flame-disinfected before use and (5) the injection to be made into the middle of the corium and ordinary broth to be used for control purposes in doubtful cases.

The interpretation of the intradermal tuberculin test is performed very strictly in Finland. In that country the term " doubtful reaction " is not used ; reactions are either negative or weakly or strongly positive. Therefore, in tests controlled by a broth injection, an increase in thickness of the tuberculin-injected area of 1 mm. or more, and, in uncontrolled (no broth) tests, an increase of 2 mm. or more, is regarded as positive.—J. E.

Eckstein, E. (1932). Ueber die Anwendung des Schnittverfahrens in der Mikrobiologie. [**On the Use of the Sectioning Method in Microbiology**].—*Zlb. Bakt. I.* (*Orig.*). **126.** 563-568. 4 figs. [12 refs.]

The author directs attention to the usefulness of the sectioning method in microbiology and gives instructions for the preparation of sections of agar cultures of fungi and bacteria. The cultures are fixed in an isotonic formalin solution (1 part formalin, 3 parts aqua dist., 0·85 per cent. sodium chloride) and cut by means of the freezing microtome. Cultures of fungi with an air-mycelium are killed in methyl-alcohol which after several hours is followed by the isotonic formalin solution. About 24 hours later the formalin is washed out and the air-mycelium is embedded in agar. Before cutting the material is again fixed in formalin. With regard to the details of the technique the original must be consulted.

—R. Wetzel (Hanover).

Hauduroy, P., & Erhinger, G. (1932). Un nouvel appareil pour la culture des microbes anaérobies. [**A New Apparatus for the Culture of Anaerobic Bacteria**].—*C. R. Soc. Biol. Paris.* **110.** 784-786.

This article describes an apparatus with which the authors have been able to obtain surface cultures of *Clostridium tetani*, *Cl. welchii*, *Cl. septique*, etc.

The principle is first the removal of air from the container by means of a vacuum pump and the subsequent absorption of the last traces of oxygen by means of a mixture of potassium hydrate and pyrogallic acid. The apparatus consists of a glass jar with movable glass lid, the edges of each being ground to make an air-tight junction with the use of plasticine, etc. In the jar there is an opening near the top with a side tubule and tap for connection to the vacuum pump. Inside the jar there is an arrangement which holds a container with a tap for 25 c.c. of potassium hydrate solution. The tap of this container can be opened by a metal arm passing through the wall of the jar to the outside. This tap can be turned, after the production of a vacuum, and allows the alkaline solution to flow on to pyrogallic acid (15 g.) lying on the floor of the jar. Inside the jar there is placed a mercury manometer, and the usual methylene blue mixture to indicate the presence or absence of oxygen. [It is not easy to understand why this apparatus is described as new. Apparatus of this nature and the principle used must have been in use for many years in all laboratories where anaerobic bacteria are studied. This apparatus suffers from the usual disadvantage of having glass side tubules and taps which readily become broken off].—S. H. Gaiger.

Green, R. (1932). **A Rapid Method of Staining and Mounting Mid-Guts of Mosquitoes for the Demonstration of Oocysts.**—*Parasitology*. **24.** 305-306.

This method is recommended for staining and preserving specimens of oocysts in the midgut for future demonstrations. One per cent. formaldehyde in normal saline is run under the cover slip, excess fluid is removed by blotting paper and the specimen is put in a closed petri dish with moist blotting paper for ten minutes. Pugh's stain is then run under the cover slip and left for five minutes. The cover slip is then removed and the specimen may remain on the slip or on the slide. The specimen is then put through the following :—(a) acetone—95 parts, xylol—5 parts, for 30 seconds ; (b) acetone—70 parts, xylol—30 parts, for 1 minute ; (c) acetone—30 parts, xylol—70 parts for $1\frac{1}{2}$ minutes ; (d) xylol for 2 minutes. Excess xylol is then removed with blotting paper and the specimen is put through clove oil to Canada balsam and covered with another slip or slide, whichever is required.—U. F. Richardson.

Davidson, A. M., & Gregory, P. H. (1932). **A Convenient Source of Wood's Light for the Diagnosis of Ringworm of the Scalp.**—*Canad. Med. Ass. J.* **27.** 176-177. 2 figs.

A description of a simplified apparatus for the diagnosis of ringworm of the scalp, making use of the fact that hairs infected with these fungi fluoresce with a green light when irradiated with ultra-violet light in the dark. The source of light used is a Mazda " Photoflood " lamp. Further apparatus designed to keep the whole cool, to filter and to concentrate the light is described. A glass lens is used and this is said to be effective in transmitting the long wave ultra-violet radiation. The apparatus is portable, weighing about 2 lb., and can be directed to any area of the scalp by a handle at the back.

The fluorescence test is not infallible ; species of *Trichophyton* do not appear to give the characteristic fluorescence, but most other ringworm fungi are readily detected by this means.—W. R. Wooldridge.

MISCELLANEOUS.

Froehner, R. (1933). Unrechter aneuanc. Rechtsgeschichthliche Bermerkungen über einen juristischen Hauptgewährfehler im altdeutschen Viehmängelrecht. [**Legal Historical Observations on Old German Laws regarding Cattle Theft**].—*Arch. wiss. prakt. Tierhlk.* **66.** 86-92. [25 refs.]

A learned juristic and linguistic study of ancient local German laws relating to the possession of animals obtained by indirect means, e.g. animals which have been stolen and then disposed of, with a comparison of the differences in meaning of several allied ancient legal terms.—F. Bullock.

Department of Scientific and Industrial Research. (1933). **Index to the Literature of Food Investigation. Vol. 4. No. 2, September, 1932.** pp. iv+32. London : H.M. Stat. Office. [8vo.] [2s. 6d.]

At the Imperial Research Conference in 1927 it was decided that " Research Institutes of the Empire " should be kept abreast of progress in " Preservation and Transport of Food " by the issue of periodic lists of elaborated titles of useful publications, from the Low Temperature Research Station at Cambridge. These lists are issued in March and September each year and the present volume is the second issue of the fourth year.

The list of periodicals scanned is given and the references are arranged in 15 sections :—meat, pig-flesh, poultry and game, fish, eggs, dairy produce, fats and oils, fruits and vegetables, grain crops and seeds, theory of canning, theory of freezing and chilling, bacteriology, mycology, engineering, and miscellaneous.

Anything from three words to ten lines is provided to indicate the nature of the paper listed. The range of subject matter is wide and covers not only the various aspects of food preservation and transport, but also biochemical papers such as " Phase Rule Equilibria of Horse Serum Globulin " (p. 15), " A New Methoxy—dihydroxy—toluquinone Produced from Glucose by Species of Penicillium " (p. 143), and agricultural papers such as " Investigations into the Intensive System of Grassland Management " (p. 113).

The list should prove invaluable to workers in the field of food investigation and put them on to the track of most of the papers they are likely to want to see in the original.—H. H. Green.

Brown, W. L. (1932). **The History of the Introduction of Biochemistry into Medicine.**—*Proc. Roy. Soc. Med. London.* **25.** 1046-1054.

A short review of the history of the clinical applications of some biochemical observations.—W. R. Wooldridge.

Clark, A. J. (1932). **The Controversy between Determinism and Vitalism in Biology.**—*Friends' Quarterly Examiner.* First Month. pp. 27-46.

Professor Clark's discussion of a time-honoured problem will be welcome to those interested in the philosophy of science, especially those dissatisfied with a purely mechanistic conception of life. He comes frankly into the open as a vitalist, proves useful ammunition for antimechanistic debaters, and in " Holism " finds a credo acceptable to a modern biologist [the philosophical standpoint from which General Smuts gave his presidential address to the British Association for the Advancement of Science in 1931].

After pointing out that any discussion of the relative merits of determinism and vitalism is complicated by the fact that the dispute between these two schools of thought is really only a modern form of the ancient religious controversy between

" predestination " and " free will," he argues that mechanistic science, however satisfactory its explanation of the behaviour of large populations [in the statistical sense], has always failed to account for the vagaries of conduct of single individuals.

He admits that "every scientist is a pragmatist at heart and " his fundamental test for any philosophy is whether it favours or retards knowledge," but he takes exception to any description of the advance of biology during the last century as a process of replacement of vague vitalist ideas by accurate mechanist conceptions; and takes particular exception to the treatment of " consciousness " (the existence of which no individual denies to himself) as an " epiphenomenon " dumped as a piece of useless luggage on to the roof of the mechanist carriage because it is difficult to fit inside.

By vitalism in biology, Professor Clark means the frank acknowledgment that we know absolutely nothing of the force that correlates the activities of the living cell and that there is every reason to believe that it is not explicable by the laws of physics and chemistry. As a biologist he finds satisfaction in the knowledge that in adopting this attitude he is not attempting to force nature into the narrow limits of imperfect systems which ignore what they cannot explain, and that he is no worse off than the modern physicist who started the present century with the belief that he had exact knowledge of atomic behaviour, but today doubts whether the individual atom can really be regarded as subject to rigorous laws of cause and effect.

He is much in sympathy with SMUTS [the statesman-soldier-philosopher author of " Holism "] who insists that the biologist deals with tissues of unique properties and that " if he studies these properties he will have something of positive value to offer to the physicist and chemist, instead of trailing in their rear as a camp follower too disreputable to be accorded recognition."—H. H. GREEN.

OFFICIAL AND OTHER REPORTS.

HAMMOND, J. (1932). **Report on Cattle-Breeding in Jamaica and Trinidad.** pp. 70. 64 figs. on 34 plates, 1 table. [9 refs.] London : H.M. Stat. Office. [8vo.] [1s.]

The author, on the staff of the School of Agriculture, Cambridge, has written a general report of the result of his observations during a short stay in the West Indies upon the inheritance of milk-yield, fat percentage, and other characters of cows cross-bred from the Indian zebu. The report includes also some account of the general conditions of agriculture in the islands visited.

Part I deals with the experiments at the Government Stock Farm, Hope, Kingston, Jamaica. In Jamaica small settlers engaged in milk production obtain only low yields and the consequent deficiency in liquid milk available has led to a rapidly increasing importation of condensed milk. To meet the needs of supply to public services, the Government established a stock farm at Hope in 1910, but the enforced economy of management has hampered any scientific analysis of the conditions for milk production, attention having been concentrated more upon the questions of feeding and breeding.

Dairying in the tropics has to contend with many difficulties, such as liability of cattle to contract tick fever and the tendency to degeneration witnessed in imported cattle kept under conditions foreign to their natural surroundings. The object in view has, therefore, been to breed a race of milking cattle resistant to the disabilities arising from a tropical environment. The Government Stock Farm has been utilized for this purpose and, by crossing native-bred stock of several

pure European breeds, has succeeded in rearing cross-bred cattle to supply bulls for improving the quality of the milking herds, and cows to provide a badly needed fresh milk supply.

The formation of commercial dairy herds in Jamaica is hindered by the lack of a modern system of handling milk. At present the " family cow " provides milk within the towns, any shortage being made good by the use of condensed milk which is imported in quantity almost equal to the value of exports of cocoanuts (£167,000).

In order to promote the development of better milking qualities, the methods of milking and feeding require improvement. Owing to the rapid conversion of grass in the tropics to indigestible fibre, there is scope for a selection of grasses which are less liable to this change. Irrigation assists in retarding this conversion to fibre, and, where this method has been adopted, better results are attained. Silage made from guinea corn has proved an efficient form of cattle food. Tropical substitutes for wild white clover are needed to supply proteins and to act as nitrogenous fertilizers. Concentrates are scarce and expensive, but the developments in the cocoanut oil trade may help to provide locally-produced concentrated feeds.

The present native stock of very mixed descent is hardy and adaptable, but there is a tendency to small size, and the development of large horns and heads and general legginess which gives the herds a very irregular appearance. They are too slow for draught purposes, unsuitable for beef and have poorly developed udders.

After preliminary failures with native cows, an attempt was made to grade up with European blood. Unless this method is proceeded with gradually, weakened constitutions may result and it appears better to utilize selected local stock especially in regard to bulls from good milking strains. The author cites in support of the above suggestion the results obtained at the Experimental Farm at Pusa, India, with the Montgomery (Sanhiwal) breed of zebu cattle. A bull of this breed imported to Jamaica has, in comparison with other Indian breeds, greatly improved the milking stock.

In an endeavour to found a new breed, having the constitution of the zebu with the milk-producing powers and docility of the European cow, the best results have followed the crossing of 1/4 to 1/8 zebu blood and 3/4 European.

In Part II of the report dealing with Trinidad, the author remarks upon the useful combination of dairying and the sugar industry—the cows consuming by-products and providing milk and manure. In Trinidad, Friesian-zebu crosses are used. Contrary to the conditions in Jamaica where cattle remain in the open, in Trinidad they are housed and this practice protects them from the attacks of ticks and the resultant tick-fever. The incidence of tuberculosis is small, but tuberculosis and abortion are continually met with in imported animals.

In both islands the co-operation of the estates is required in the formation of a published herd book (for pure and graded cattle) in order to unify and extend the work of improvement of the dairy stock.—H. A. Reid.

Nyasaland Protectorate. (1932). **Report of the Veterinary Department for the Year ended 31st December, 1931.** [Turnbull, D. O.] pp. 8. Zomba: Government Printer. [fcp.]

The European staff consisted of four veterinary officers, two stock inspectors, and about 90 natives, 37 of whom were tank overseers.

The most important routine work was in connection with dipping—supervising operations by regular visits and testing the arsenical dip for strength. There are 92 dipping tanks in the protectorate.

Movement of livestock within the territory is restricted by the permit system and during the year the importation of cattle from Southern Rhodesia was prohibited in order to guard against the introduction of foot and mouth disease.

The condition of the native animal industry is described. Native stock are of poor quality and badly kept.

The ghee and hide industry fluctuated greatly during the year, prices being very low.

Diseases endemic in the territory include trypanosomiasis, east coast fever, piroplasmosis, anaplasmosis and *Theileria mutans* infection. No serious outbreak occurred during the year. Specific opthalmia in young cattle was common locally : it is stated that dipping appeared to have a favourable influence on it.

Rabies was diagnosed in two dogs, canine distemper was general and the common parasitic infestations were reported.—J. E.

BASUTOLAND. (1932). **Annual Report of the Principal Veterinary Officer for the Year 1931.** [VERNEY, F. A.] pp. 9. Maseru. [Typescript.]

BASUTOLAND. (1933). **Annual Report of the Principal Veterinary Officer for the Year 1932.** [VERNEY, F. A.] pp. 11. Maseru. [Typescript.]

During the year 1931, 23 outbreaks of anthrax occurred. Equine mange was less prevalent.

The position with regard to sheep scab, the most important animal disease, is explained in detail ; sufficient dipping tanks at suitable sites throughout the territory were available for the first time and, in spite of obligatory reductions in the number of dipping inspectors, it was thought that all sheep had been dipped. Basutoland contains over 2,000,000 sheep and 1,000,000 goats, which were counted for the first time during the dipping operations. The policy of leaving goats undipped (they do not harbour scab) was justified and saved money and time.

Other diseases causing some loss were strangles, biliary fever in horses and dogs and equine hepatic cirrhosis (senecio poisoning).

The condition of animal industry was bad during 1931 owing to low prices of wool and sheep and to reduction of already overstocked land by increased cultivation. A scheme for wool improvement and marketing was discussed and it was hoped that it would come into force immediately.

During 1932 there were still fewer outbreaks of anthrax ; the Onderstepoort spore vaccine has been used for some years with good results. Only in-contact cattle, those used for transport and those intended for export are vaccinated.

The results of universal dipping against sheep scab, begun in 1931, have been very promising and only a few small outbreaks were discovered later.

Thirteen outbreaks of goat scab, considered by the Chief Veterinary Officer to be due to the equine or porcine mange mite, occurred.

Other diseases, as mentioned above, still occurred to a small extent, and a disease simulating foot and mouth disease, which, however, was not contagious, was observed.

The animal industry position improved and wool prices rose. Biannual clipping is recommended for Basuto sheep. In comparison with the previous year there was a fall in the sheep and horse population ; this was not an undesirable change.—J. E.

—. (1932). **Report of Committee on Parasitic Diseases.**—*J. Amer. Vet. Med. Ass.* **80.** 484-490.

This report deals with the prevalence of the various commoner and more harmful parasites of domestic animals, with the damage they cause and the steps

which are being taken for their control in various parts of the United States. The following interesting points may be mentioned here :—

Piroplasmosis now only exists in the four southern states. Coccidiosis appears to be increasing in calves and sheep. *Bunostomum phlebotomum* is said to be responsible for severe unthriftiness and deaths in calves. Liver fluke now occurs in about 20 states, but the New England and Eastern areas are still free. As sheep pasturing becomes more intensive in the Rocky Mountain states, *Haemonchus contortus* gives an increasing amount of trouble. *Bunostomum trigonocephalum* is very prevalent, but appears to do little damage. *Oesophagostomum columbianum*, formerly found only in the south, is spreading. A modification of the McLane County Swine Sanitation system is recommended for the control of the kidney worm in pigs ; the sows houses are placed on a strip of bare ground at the edge of the field where the urine will be dried and the larvae killed by the sun. This swine sanitation system is also advocated for the control of lungworms in pigs, as the earthworms which act as intermediate hosts are much more prevalent in dirty yards than in the open field.

Recommendations are made for further research and further eradication campaigns.—E. L. Taylor.

BOOK REVIEWS.

Smith, F. [The late, K.C.M.G., C.B., Fellow and Honorary Associate of the Royal College of Veterinary Surgeons]. (1933). **The Early History of Veterinary Literature and its British Development. Vol. IV. The Nineteenth Century, 1823-1860.** Edited, with a Memoir of the Author, by Bullock, F. [LL.D.] pp. xxiv + 161. 12 plates. [numerous refs.] London : Baillière, Tindall & Cox. [8vo.] [15s.]

Sir Frederick Smith's intention in undertaking the great work, of which this is the concluding volume, was to trace the history of veterinary literature from the earliest known times down to the middle of the 19th century. This volume deals with the writings of 150 English veterinary authors, from 1823 to 1860, whether contributed to periodical literature or published in book form. The work is illustrated by a fine reproduction of the painting of Sir Frederick Smith which hangs in the Council Room of the Royal College of Veterinary Surgeons, and by portraits of 11 of the more important authors of the period.

The four decades covered by this volume were of the utmost importance both for the development of veterinary science and for the organization of the profession. The establishment of the Edinburgh Veterinary College by Dick in 1823 broke down the monopoly of the London Veterinary College ; the foundation of the *Veterinarian* five years later created the first medium for recording the observations of practitioners and inaugurated a fruitful period of frank discussion of veterinary problems both clinical and political ; the establishment of the Royal College of Veterinary Surgeons in 1844 and the reorganization of the profession which followed naturally on these events marks the beginning of the modern era in veterinary science, for the teaching of the schools had henceforth to be brought into line with the requirements of an independent board of external examiners.

All these matters are discussed in the biographies of the men whose writings are here recorded, amongst the most notable being those of John Barlow, G. T. Brown, W. Dick, John Gamgee, Joseph Gamgee, W. Haycock, E. Mayhew W. J. T. Morton, J. B. Simonds, C. Spooner, W. C. Spooner, J. Stewart, G. W. Varnell and R. Vines.

The development of the science is traced through the writings examined and the author has been careful to call attention to new discoveries and new methods.

It is impossible in a short review to refer to all the instances given, but the following are perhaps of special interest :—the original work of James TURNER on navicular disease and sesamoiditis, 1828 ; E. KING's identification of the fluke as the cause of " rot " in sheep, 1835 ; CARLISLE's caesarian operation, 1840 ; J. BARLOW's work on pleuro-pneumonia, 1842 ; MORTON's work on calculous concretions, 1844 ; W. A. CARTWRIGHT's treatment of twist of the uterus by rolling the patient, 1845 ; and MAYHEW's use of the elastic catheter for passing fluids into the stomach through the nostrils, 1847.

The brief story of the first production of clean milk on a large scale in this country by the Harleian Dairy System so long ago as 1810 is of especial modern interest.

Amongst first recorded cases are W. J. GOODWIN's account of the larynx of a roarer, 1833 ; the observation of *filaria oculi* by J. TOMBS, 1842 ; of botryomycosis by W. C. SPOONER, 1837, and of melanosis by the same author, 1840 ; R. PRITCHARD on twist of the colon, 1858 ; to which may be added John FIELD's co-operation with J. HOPE in his classical experiments on the horse's heart to determine the cause of the sounds in 1830, and KARKEEK's interesting physiological studies, 1843.

Of exceptional interest is the account of William DICK, and the foundation of his school in Edinburgh ; his early papers on sprained tendons and the mechanism of the limb, his use of iodine in inflammatory diseases of the chest and for actinomycosis ; his diagnosis of sprain of the psoae muscles ; his amputation operation after compound fractures in cattle, and in general his rapid rise to oracular authority as the result of his outstanding clinical ability. Scarcely less important are the biographies of SIMONDS and SPOONER, the account of their work at Camden Town, and their attack on the Royal College of Veterinary Surgeons. SIMONDS is given great credit for his reorganization of the teaching at the Royal Veterinary College and for his clinical account of sheep pox in 1847, but is mercilessly pilloried for his tragic ignorance and obtuseness in the matter of the great cattle plague epizootic of 1865. The writers who receive the highest praise are John STEWART for his work on soundness in horses (1831) which is described as a classic ; John BARLOW for his wide learning and great teaching ability ; Sir George BROWN for his excellent work in epizootics ; and finally John GAMGEE for his pioneer work in veterinary state medicine.

The editor has contributed a brief biography of the author and has compiled a complete list of his contributions to veterinary literature, dating from 1876 to 1929, the last being an article on dislocation of the patella written on his death-bed for the first number of the *Journal of the Royal Army Veterinary Corps*.

What is now needed is a reprint of Volume I of this work, which has long been out of print, and a further volume to complete the history of veterinary literature for the period 1860 to 1900, to which should be added an index to the whole work.—F. BULLOCK.

MARLE, W. [Generaloberarzt a.D.]. (1932). Guttmanns Medizinische Terminologie. **[Guttman's Medical Terminology]**. pp. vi + 1243. 600 figs. Berlin & Wein : Urban & Schwarzenberg. 25th & 26th Edition. [4to.] [RM.20].

This is the latest edition of a standard medical dictionary in the German language. It is set out in the conventional style for such books with two columns per page.

An addition to this edition is a page giving an introduction to the reading of Greek words, which occur here and there in the text in connection with etymology.

The type is clear, but many of the illustrations are rather out of date.

The book is, naturally, of value to those studying German medical literature.

—J. E.